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INDICATIONS FOR THE SURGICAL LIGATION OF A PATENT DUCTUS ARTERIOSUS*

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THE idea of an operation to close a patent ductus arteriosus is not a new one. Some time ago, Munro[1] suggested splitting the sternum, thereby exposing the ductus, which could then be ligated or crushed. Up to the present this has been held in the light of an intriguing possibility, but, so far as we are aware, has not been undertaken except in the case reported by Graybiel, Strieder, and Boyer,[2] where it was attempted unsuccessfully as a desperate measure in the face of almost certain death from superimposed subacute bacterial endarteritis. Heretofore the benefits to be gained have seemed less than the risks involved. The surgical approach through the superior mediastinum was justifiably considered a dangerous operation. Hesitation also arose from the knowledge that the patency of the ductus usually accompanies other cardiac defects, and that ligating it might seriously interfere with some compensatory function demanded by the anomalous circulation.

However, from a study of the statistical data compiled and recently published by Abbott,[3] it appears that patency of the ductus arteriosus as a single defect may be less rare than it was formerly thought to be. Furthermore, an increasing appreciation of the complications arising at an early age prompted one of us (J. P. H.) to inquire anew into the possibilities of correcting this defect. With the recent advances in thoracic surgery it seemed that a more favorable procedure might be found. Consequently Gross,[4] experimenting in dogs, developed a technic in which the ductus was approached across the left pleural cavity. This method promised to be reasonably safe; hence a child who was obviously handicapped by a patent ductus arteriosus was selected for operation. The details of this first successful case have already been published by Gross and Hubbard.[5]

Now, therefore, the introduction of a successful method of ligating the ductus arteriosus calls for a critical analysis of the indications for such surgical intervention. Many questions arise concerning the prognosis and complications of this cardiac malformation. The two complications of greatest importance are subacute bacterial endarteritis and congestive failure. Just how frequent is subacute bacterial endarteritis with a patent ductus arteriosus? At what age is it most apt to occur? Can surgery prevent it? Who are the patients likely to develop cardiac insufficiency? What is the optimal age for the operation? The present communication is an attempt to answer some of these questions and to arrive at a rationale for ligating the ductus.

SUBACUTE BACTERIAL ENDARTERITIS

Of the 1000 cases of congenital malformation of the heart collected from the literature by Abbott[3] and critically studied by her, there are 92, shown in her statistical chart, in which a patent ductus arteriosus is described as uncomplicated by other defects.* Nineteen of these were infants less than two years of age at death. For our present purposes these may be excluded from the series on the grounds that subacute bacterial endarteritis does not occur in infancy, and that in early infancy it is difficult to determine whether we are dealing with a pathologically patent ductus or a delayed physiologic closure. There remain then, 73 cases, of which subacute bacterial endarteritis was shown to be present in 22.† This gives an incidence for her series of 30 per cent, but it is

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*Since this is the best collection of material anywhere available, we took advantage of the opportunity, made possible through the courtesy of Dr. Abbott, of reviewing her well-recorded data in order to gain more detailed information than appears in the chart. We gratefully acknowledge her kindness and help.

†Abbott lists 21 cases where death was due to subacute bacterial endarteritis. There is 1 additional case (Table 1, Case 12) in her series complicated by subacute bacterial endarteritis where death was attributed to intercurrent tuberculosis.

important to realize that this is a series of cases collected from the literature. They present a striking clinical and pathologic picture, and as such are obviously more apt to be reported than cases of consecutive autopsies performed over a period of forty years.

In order to learn more of the age incidence and certain pathological features, an analysis has been

TABLE 1. *Autopsied Cases of Patent Ductus Arteriosus Complicated by Bacterial Endocarditis and Endarteritis.*

CASE NO.	SOURCE	SEX	AGE AT DEATH yr.	LOCATION OF VEGETATIONS	REMARKS
1	Murray,[7] 1888	F	36	PA, TV, MV, AV	Rheumatic fever at 26 yr.
2	Kidd,[8] 1893	F	22	Posterior wall of PA, AO	DA entering left branch of PA
3	Rickards,[9] 1889	M	17	PA, PV, wall of A opposite DA	
4	Hochhaus,[10] 1893	M	24	PA, DA, wall of A	Rheumatic fever at 12 yr.
5	Gauchery,[11] 1900	F	27	PA	PA and A adherent
6	Buchwald,[12] 1878	F	21	DA, A, PA, PV, AV, MV	Aneurysm of PA
7	Hart,[13] 1904	M	23	PA, DA, AV	
8	Hart,[13] 1904	F	24	PA, DA, AV	
9	Hamilton and Abbott,[14] 1914	F	19	PA, DA	Coarctation of aorta
10	Schlagenhaufer,[15] 1901	M	13	PA at orifice of DA	Paradoxical embolus
11	Foulis,[16] 1884	F	22	PA, DA	Aneurysm of PA opposite PO
12	Chevers,[17] 1845	F	Adult	PO	Death from tuberculosis
13	Rokitansky,[18] 1862	F	23	DA, MV, TV	
14	Stoddard,[19] 1915	F	17	AV (bicuspid), PO	AV and PV bicuspid
15	Horder,[20] 1909	F	42	PO to PV, AV	
16	Boldero and Bedford,[21] 1924	M	29	PO to PV, AV, MV	
17	Abbott,[22] 1925	M	33	PO, PA, PV, TV	Foramen ovale, patent DA partly obliterated
18	Schlaepfer,[23] 1926	M	8	DA, PA	
19	Sacha,[24] 1892	F	21	PA, PV, AV	
20	Krzyszkowski,[25] 1902	F	17	PO, PA	Fibrinous pericarditis
21	Sommer,[26] 1910	F	45	PO to PV	
22	Terplan,[27] 1924	F	35	Both ends of DA	
23	Trimble and Larsen,[28] 1931	F	15	PO, PA, MV	
24	Hines and Wood,[29] 1935	F	19	PO, AO, PA, PV, wall of RV	
25	Graybiel, Strieder and Boyer,[2] 1938	F	22	PO, PA	Death from acute dilatation of stomach 4 days after attempt at surgical obliteration
26	Case records of the Massachusetts General Hospital,[30] 1938	F	21	PA, AV, MV	A and PA in apposition with a hole between representing DA
27	Brown,[31] 1933	M	12	PO, PA, AV	
28	Perry,[32] 1933	F	36	PO, AV extending to MV	
29	Blumer and McAlenney,[33] 1931	M	17	PV only	
30	Blumer and McAlenney,[33] 1931	M	8	PA, DA	
31	Viswanathan,[34] 1931	M	16	PO, PA, PV, AV	
32	Gordon and Perla,[35] 1931	M	13	PO, PA	Narrowing of pulmonary orifice of RV
33	Philpott,[36] 1929	F	6	PA, DA	See footnote*
34	Fischer and Schur,[37] 1932	F	31	PO, PA, PV, AV	
35	Weinberger,[38] 1903	F	37	DA, PA, A, PV	
36	Hammerschlag,[39] 1925	F	51	DA, PA, A, MV	Aneurysm of DA
37	Chalier, Riou and Roget,[40] 1935	F	21	PA, PV, TV, MV, AV, A	
38	Roth,[41] 1927	F	23	PO	
39	Entz,[42] 1911	F	7	MV, PO, in aneurysm of PA	Aneurysm of PA

Abbreviations: DA — *ductus arteriosus;* PO — *pulmonary orifice of ductus arteriosus;* AO — *aortic orifice of ductus arteriosus;* A — *aorta;* PA — *pulmonary artery;* PV — *pulmonary valve;* TV — *tricuspid valve;* MV — *mitral valve;* AV — *aortic valve;* RV — *right ventricle.*

patent ductus arteriosus where death was due to other causes. It is impossible from a collection of case reports to determine the incidence of this complication. It would be necessary to pick out from a consecutive series of general autopsies or well-established clinical cases without postmortem examination all cases of patent ductus arteriosus, excluding infants, and to observe what proportion of these were complicated by subacute bacterial endarteritis. Since the condition is not a common one this would mean an undertaking of considerable magnitude in order to obtain a significantly large series. In a study of congenital heart disease at the Massachusetts General Hospital, McGinn and White[6] found only 5 cases of uncomplicated patent ductus arteriosus in 7500 made of the cases reported in the literature. In Table 1 are listed those collected by Abbott (Cases 1-22), together with an additional 17, making a total of 39. The age incidence is summarized in Table 2. As shown here, the disease is primarily one of late childhood or early adult years. The youngest patient (Case 33) on record was a six-year-old girl.[36]* One death occurred at seven years, and 2 at eight. It is noteworthy that 27 (71 per cent) of the patients succumbed before the age of twenty-five, and 19 (50 per cent) of them between sixteen and twenty-five.

Table 1 shows another fact of considerable im-

*There is some doubt regarding this case. The author described *Streptococcus viridans* vegetations superimposed on sclerotic changes of the ductus arteriosus and pulmonary artery. These changes he ascribed to congenital syphilis. May they not have been the sclerotic changes sometimes associated with patent ductus arteriosus?

portance. In all but 1 case the vegetations were located at the pulmonary orifice of the ductus, or implanted on the wall of the pulmonary artery. In Blumer and McAlenney's first patient (Case 29) the vegetations were found on the pulmonary valve alone. The pulmonary valves are frequently involved, the other valves less often. The location of the vegetations may be reasonably explained on the basis that the intima of the vessel walls at or near the ductus orifice is subject to sclerotic changes.[12, 18] Grant, Wood and Jones[43] have

TABLE 2. *Age Distribution of 39 Cases of Patent Ductus Complicated by Bacterial Endarteritis.*

AGE	NO. OF CASES		
yr.			
0–5	0		
6–10	4		27 (71%)
11–15	4		
16–20	7	19 (50%)	
21–25	12		
26–30	2		
31–35	3		
36–40	3		
Over 40	3		
Unknown	1		
Total	39		

shown that such sclerotic areas favor the formation of platelet thrombi, which in turn become infected by bacteria in the blood stream, giving rise to bacterial endocarditis.

From the foregoing it would seem reasonable to hope that ligation of the patent ductus may prevent the development of bacterial endarteritis, but at the present state of our knowledge there is no certainty of this. There is no proof that a ligated ductus may not offer just as favorable a site for the implantation of thrombi and vegetations as does a patent ductus. In fact, a patient (Case 17) described by Abbott[22] suggests such a situation. Here the ductus was represented by a fibrous cord on the aortic side, while on the pulmonic side there remained an aneurysmal sac from which arose bacterial vegetations. Also to be considered is the fact that recovery from subacute bacterial endocarditis, superimposed on a patent ductus arteriosus, has been reported.[44]

Rarely a patient who has already developed bacterial endarteritis on a patent ductus may be considered for operation as in the patient (Case 25) of Graybiel, Strieder and Boyer.[2] In such a situation it is conceivable that if an operation were done soon after the diagnosis was first made, the vegetations might be limited to the ductus and the operation prove successful. In view of the almost certain fatality without intervention, it would seem justifiable to take this rather desperate chance.

CARDIAC INSUFFICIENCY

The second important consideration is the danger of cardiac insufficiency resulting from the increased work of the heart, due to the arteriovenous communication. Much of the arterial blood pumped into the aorta passes through the ductus into the pulmonary circuit. This calls for increased work on the part of the left ventricle in maintaining an adequate peripheral circulation, and on the part of the right ventricle in overcoming the pulmonary pressure, which is elevated by the added load of arterial blood. Eppinger, Burwell and Gross,[45] by taking samples of blood directly from the pulmonary artery at the time of operation, have been able to demonstrate that the work of the heart with a wide-open ductus may be excessive. It is not surprising, therefore, that a considerable number of patients succumb to congestive failure. In Abbott's series, excluding the infant group of 19, there were 24 of 73 cases (32 per cent) in which death was attributed to heart failure.

On the other hand, patency of the ductus arteriosus may be compatible with a long and active life. Three cases[46, 47, 48] are on record, in which the patients lived to the sixty-sixth or sixty-seventh year. Manges[49] reports a woman who went through 8 successful pregnancies.

It would seem likely that the development of heart failure depends on the magnitude of the arteriovenous shunt and the extent to which it increases the normal load of the heart. Therefore, from the point of view of selecting cases for operation it becomes of the greatest importance to determine which have large shunts and are the ones most apt to develop failure. Evidence of a large shunt is available from an understanding of the abnormal circulation. A considerable amount of blood flowing from the aorta into the pulmonary artery produces the signs usually associated with aortic regurgitation: Corrigan pulse, wide pulse pressure, capillary pulsation, Duroziez's sign and hypertrophy of the left ventricle. At the same time the pressure in the pulmonary artery is increased by the added volume of blood, causing engorgement and pulsation of the pulmonary vessels at the hilus of the lung; this may be seen by fluoroscopy. The pulmonic second sound, if it is not obscured by the loud murmur, is often accentuated. Further evidence may appear in the general condition of the patient. In the child, if enough oxygenated blood escapes through the ductus so that the heart, even despite its greatly increased output, cannot maintain a normal peripheral circulation, growth and development may be impaired. Obviously the presence of dyspnea or other common signs of cardiac insufficiency indicates a severely overburdened heart.

This clinical picture was well illustrated by the first child to have her ductus ligated.[5] She had always been thin, small and underweight, and, as

described in detail in the preliminary report, had the peripheral signs of aortic regurgitation. Following the surgical closure of the ductus, the peripheral signs of regurgitation, present preoperatively, disappeared. The pulse pressure returned to normal; the Corrigan pulse and capillary pulsation were no longer present. This can be explained on no other basis than that of interrupting the abnormal currents.

Emphasis should be put on the signs of regurgitation associated with patency of the ductus arteriosus. They should always be looked for and, if present, should serve as valuable evidence of a shunt large enough to throw an undue burden on the heart.

OTHER COMPLICATIONS

There are two other complications of patency of the ductus arteriosus which may be briefly mentioned. Three cases are on record[44, 50, 51] in which aphonia was attributed to pressure on the left recurrent laryngeal nerve by the ductus. This is undoubtedly a rare condition, but might conceivably serve as an indication for ligating the ductus and relieving the pressure.

Second, there is the danger of developing an aneurysm of the ductus or of the pulmonary artery adjacent to the ductus, with the possibility of death from rupture of the aneurysm. This also is a rare condition. Abbott[3] lists 13 cases of aneurysm of the ductus. Hammerschlag[39] has reviewed the subject rather completely and refers to cases in all age groups from infancy to late adult life.

CONCLUSIONS

From the foregoing it seems reasonable to adopt the position that any patient with a diagnosis of patent ductus arteriosus should be carefully studied to determine whether or not there is an arteriovenous shunt large enough to impair the normal cardiac function and the peripheral circulation. The evidence to be looked for is a delay in the growth and development of the child, any signs or symptoms of cardiac insufficiency and, more specifically, the signs of free aortic regurgitation, congestion or pulsation of the pulmonary vessels at the hilus of the lung as seen by x-ray. These findings should be considered as danger signals. Once they have been established, surgical intervention should be considered in the hope of abolishing the excessive load on the heart, restoring normal circulation, allowing normal growth and eliminating the danger of heart failure.

In regard to the possibility of preventing subacute bacterial endarteritis, the situation is uncertain. It will be necessary to observe the successfully treated cases for years before we can say with conviction that this danger has been removed. If a ligated ductus does remain free of vegetations and if the surgical risk remains as low as now seems possible, it would then, and only then, appear permissible to operate with the expectation of preventing this fatal complication. The optimal age would seem to be in childhood before the second decade, when the incidence of subacute bacterial endarteritis increases, and after the period of infancy. In infancy there is little or no chance of developing this complication and, furthermore, the diagnosis is usually difficult. Two of the cardinal signs of a patent ductus arteriosus, the thrill and characteristic loud continuous murmur, are apt not to be found. Of the 19 infants in Abbott's series, there was only one, ten months old, in whom the murmur was observed to extend into diastole.

In any event, a great deal will depend on the surgeon's ability to maintain a low operative risk. The dangers confronting a patient with a patent ductus arteriosus are considerable, but they are not so great as a glance at the statistical data in Abbott's chart might suggest. In the first place, the average age at death in her series is twenty-four, but it is unfair to assume that this indicates a fair life expectancy for the patients for whom surgery might be considered. As we have already pointed out, 19 of the group were infants, many in the neonatal period. Since we are concerned with the prognosis of older patients, the infants should be excluded. By eliminating this group at one extreme of the age distribution, the average age at death for the remainder would be considerably higher. A second factor which tends artificially to lower the average age at death in Abbott's series is the proportion of patients dying of subacute bacterial endarteritis, which, as we have shown, is unnaturally large in a collection of case reports. These patients usually die young, and this makes the average for the whole group too low. Furthermore, the mortality statistics can be misinterpreted in regard to the number of deaths resulting from the presence of the cardiac defect. It is not justifiable to add together the 21 deaths from subacute bacterial endarteritis, the 16 "sudden deaths" and the 24 deaths from cardiac insufficiency, arriving at a mortality of 66 per cent to be established as the risk the surgeon has to work against. No proof has as yet been given to show that ligation of the ductus can prevent the deaths from subacute bacterial endarteritis. Also from a review of the cases listed under the heading of "sudden death" we are not convinced that they were always attributable to the patency of the ductus arteriosus.

Neither of these two groups can, at the present time, fairly be included in considering those whose deaths might have been prevented by surgery. From the point of view of establishing such a group, we are left with the deaths from cardiac failure. These occurred for the most part in an older age period. There must be many who live with their patent ducts to an active old age but who, because they do not have an interesting complication and do not qualify for a record age, have not been included in any available statistics. Should such individuals have been subjected earlier in life to an operation unless with the assurance of a low surgical risk?

It is our conviction that until more is known of the operative mortality and the future of the cases already treated, surgical intervention should not be recommended for all patients with a patent ductus arteriosus, but should be limited to those showing evidence of circulatory embarrassment. For these, in the hands of a skillful surgeon, it has to date proved a successful and reasonably safe procedure.

SUMMARY

In a patient with a patent ductus arteriosus, retardation of growth, signs of aortic regurgitation or evidence of cardiac insufficiency should suggest a shunt large enough to throw an excessive burden on the heart and should serve as an indication for ligation of the ductus.

Ligation of a patent ductus may lessen or altogether remove the danger of developing subacute bacterial endarteritis, but to date there is no proof of this. Final judgment in this regard should be withheld until more is known of the surgical risk, and until it has been shown by years of observation that a ligated ductus remains free of this complication.

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SURGICAL ASPECTS OF OBSTRUCTIVE JAUNDICE*

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WHEN the physician is confronted with a jaundiced patient a decision must be made as to whether medical or surgical treatment is indicated. Surgical treatment should follow the diagnosis of obstructive jaundice. However, before surgery is carried out the two commonest causes of obstructive jaundice, namely common-duct stone and carcinoma of the head of the pancreas, should be differentiated. Such a differential diagnosis is essential because it may alter not only the preoperative preparation but also the time and type of surgical treatment. A comparative study of a group of patients entering the Peter Bent Brigham Hospital with obstructive jaundice led us to believe that there was sufficient contrast in symptoms to enable the physician in most cases to distinguish between carcinoma of the head of the pancreas and common-duct stone without the necessity of numerous laboratory tests.

A comparison of the symptoms of 75 consecutive cases of common-duct stone and 49 consecutive cases of carcinoma of the head of the pancreas is given in Table 1. Since tumors of the body or tail rarely obstruct the common bile duct and produce jaundice, only the cases of carcinoma with involvement of the head were included in our study. It was interesting to note that of 56 consecutive admissions of carcinoma of the pancreas, there were 49 with involvement of the head and 7 of the body or tail, a ratio of 7:1.

Probably the most valuable differential finding was the high incidence (100 per cent) of a history of gall-bladder disease accompanying common-duct stone compared to 18 per cent with cancer of the head of the pancreas. The latter percentage may be explained in part by the fact that several of the carcinoma patients had gallstones.

In 91 per cent of the cases with common-duct stone a clear-cut history of biliary colic was found. Although very few (16 per cent) of the patients with tumor had colic, more than 77 per cent of these had distress and pain of varying severity. The various locations of pain are shown in Table 1. Relatively few (18 per cent) of those with cancer of the pancreas had pain referred to the back, in comparison to 67 per cent of the cases of common-duct stone. The high incidence (40 per cent) of epigastric pain in patients with calculus has been previously emphasized.[4]

Eighty-six per cent of the tumor cases had a marked loss of weight, as compared to 25 per cent of the cases of common-duct stone. The average monthly weight loss recorded in 41 cases of tumor of the pancreas was 7 pounds during the illness culminating in operation. Although one fourth of those having common-duct stone gave a history of weight loss, in no case was this as great as that in the carcinoma group, and it may in part be explained by the persistent nausea or intolerance to food which continued over a sufficiently long period to account for an appreciable loss of weight.

TABLE 1. *Comparison of Symptoms and Findings in 75 Cases of Common-Duct Stone with Those in 49 Cases of Carcinoma of the Head of the Pancreas (Consecutive Cases).*

SYMPTOM OR FINDING	DIAGNOSIS: COMMON-DUCT STONE	DIAGNOSIS: CARCINOMA OF THE HEAD OF THE PANCREAS
	%	%
Past history suggesting gall-bladder disease	100	18
Colic	91	16
Location of pain:		
Right upper quadrant	53	20
Epigastrium	40	33
Left upper quadrant	5	2
Referred to back	67	18
Weight loss	25	86
Jaundice:		
Incidence	81	86
Intermittent	35	12
Vomiting	77	37
Chills	33	8
Sex:		
Male	13	69
Female	87	31
Enlarged gall bladder	12	55
Enlarged liver	25	80
Operative mortality	10	31
Age in years (average)	55	58

The incidence of jaundice in both groups was very nearly the same, occurring in approximately three fourths of the cases. The average duration of the jaundice in the carcinoma group was six weeks, with jaundice persisting or increasing in 73 per cent. However, only 12 per cent of the patients with carcinoma gave a history of jaundice exclusive of that associated with the present illness, while at least one third of those with common-duct stone had been jaundiced one or

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more times previously. The presence of jaundice, therefore, has not so much differential diagnostic value as the history of intermittent or decreasing jaundice. The icteric index was used to determine the degree of jaundice in the majority of cases. Pruritus also was a troublesome symptom in many of these cases.

Spontaneous vomiting was present in 77 per cent of the group with common-duct stone, in contrast to 37 per cent in the carcinoma group. Previous experimental and clinical evidence has indicated that sudden distention of the common duct, such as that occurring from an occluding calculus, produces vomiting and epigastric distress.[4] Consequently, marked vomiting in the patients with gall-bladder disease is considered a definite symptom indicating a common-duct stone, and has been added to the list of indications for exploration of the common duct. While approximately one third of those with carcinoma gave a history of vomiting, it was not so marked as that associated with common-duct stone. In only 2 of the 49 cases of carcinoma of the head of the pancreas was there operative evidence of sufficient duodenal obstruction from the neoplasm to cause vomiting.

Chills and fever, which are an indication of cholangitis, did not accompany more than one third of the cases of common-duct stone, although a diagnosis of the latter is usually made, according to the textbooks, on a history of jaundice, colic, chills and fever. This symptom was rarely present (8 per cent) in cases of carcinoma.

The sex ratio was reversed in common-duct stone and carcinoma according to our reports. Eighty-seven per cent of the patients with common-duct stone were women, while 69 per cent of those with carcinoma of the pancreas were men. This ratio, while not specific, may occasionally influence the physician in making a diagnosis.

The age of the patient contributed very little in distinguishing between the two conditions. As would be expected, the average age in patients with carcinoma (fifty-eight) was slightly more than that of those with common-duct stone (fifty-five). It is of interest to note that the average age of the group with a proved common-duct stone was approximately five years higher than that of our cases with calculi limited to the gall bladder.

The physical findings may be of distinct value in making a diagnosis. Tenderness in the right upper quadrant or epigastrium was frequent in the presence of common-duct stone, but an enlarged gall bladder was rarely encountered (12 per cent). It was found in this series also that Courvoisier's law was moderately accurate, and of considerable value in making a differential diagnosis. A large, palpable gall bladder in the presence of jaundice is presumptive evidence of neoplasm and was found in 55 per cent of the patients. The gall bladder was palpated preoperatively in more than 70 per cent of the cases of tumor involving the head of the pancreas in which anastomosis was done between the gall bladder and some portion of the intestinal tract.

Enlargement of the liver was found in over three fourths (80 per cent) of the group with carcinoma of the pancreas, as compared to one fourth of that with common-duct stone. The physical finding of an enlarged liver does not necessarily indicate metastasis from the carcinoma, but more commonly a diffuse enlargement attributable to bile stasis. An irregular, hard mass was palpated in the epigastrium in only 9 per cent of the cases of tumor.

When the diagnosis of obstructive jaundice due to tumor is made, operative interference should not be denied the patient. It is imperative to confirm the diagnosis as well as to rule out the possibility of a calculus. In addition, a palliative surgical procedure may afford the patient a more comfortable terminal existence or serve as a first-stage operation designed for the removal of the neoplasm. Occasionally the symptoms of common-duct stone may simulate so accurately those of advanced carcinoma of the pancreas or bile ducts that it is impossible to make an accurate differential diagnosis clinically. Patients were seen who had not been operated on earlier because of the diagnosis of advanced carcinoma of the head of the pancreas or the common bile duct, yet at a future exploration a common-duct stone was removed, with complete recovery.

Of the 49 patients operated on for cancer of the head of the pancreas, the hospital mortality was 31 per cent. When those patients having exploration only were omitted, 26 of the 33 on whom a palliative short-circuiting operation was performed survived, reducing the mortality to 21 per cent. The short-circuiting operation was performed by anastomosing the gall bladder to the duodenum (cholecystduodenostomy) in 16 cases and to the stomach (cholecystgastrostomy) in 15 cases, and the common duct to the duodenum (choledochoduodenostomy) in 2 cases. On 9 of these 26 patients we have no follow-up records, but all had experienced relief of pruritus, pain and jaundice on leaving the hospital. Of the remainder, who lived for an average of about nine months, 100 per cent were free of pruritus, 88 per cent were relieved of pain, and 100 per cent were either completely or partially relieved of jaundice.

Since this study was started, a valvular type of cholecystgastrostomy has been substituted for direct cholecystgastrostomy in an effort to prevent gross

regurgitation of the intestinal contents into the biliary passages and thus forestall ascending biliary infection.[5] The valve effect is obtained by implanting the elongated gall bladder for a distance between the seromuscular coat and mucosa of the stomach. When the operations for short-circuiting the gall bladder to the intestinal tract have been used merely as a palliative procedure, ascending biliary infection has not been a serious problem because of the brief survival period. But a high incidence of infection has been reported by Whipple[3] when this anastomosis has been used in conjunction with resection of the head of the pancreas. Consequently other types and sites of anastomosis have been selected in an effort to lower the incidence of ascending infection in patients in whom there is a reasonable chance of a prolonged survival period. We believe that this modification of cholecystgastrostomy answers the major objections to the use of the stomach for anastomosis, since experimentally it has prevented gross regurgitation of stomach contents into the biliary passages. By preventing regurgitation the incidence and severity of ascending biliary infection should be lessened, making the more complicated types of anastomosis recently recommended unnecessary.

At the time of the short-circuiting operation, the surgeon should determine from the location and size of the lesion whether there is a reasonable chance of its excision. If excision seems possible, the anastomosis of the gall bladder to the intestinal tract should be accompanied by a gastroenterostomy. Following general improvement, the patient should be re-explored in an attempt to remove the tumor. The successful number of resections of the head of the pancreas indicate that the operation of anastomosing the gall bladder to the intestinal tract should be considered as a part of a first-stage operation in much the same light in which the surgeon carries out a transverse colostomy preliminary to resecting a neoplasm of the sigmoid. Should the lesion offer no hope of excision, deep roentgen therapy may be given with beneficial effect.

When the diagnosis of common-duct stone has been made at the onset of jaundice, operation should be delayed a few days in the hope that the jaundice and biliary infection, if present, will subside. Furthermore, elevated blood diastase levels, in the early stages of blocking of the common duct by a calculus, indicate considerable interference with pancreatic function.[1] The decision to explore the common duct depends on many factors in the history and symptoms other than jaundice, including the anatomical findings presented to the surgeon by palpation and visualization at operation.[2] Although preoperative diagnosis can usually be made, it should be reemphasized that a common-duct stone may produce a silent jaundice simulating malignancy or may fail to produce jaundice at any time. Of the 389 consecutive cases of cholelithiasis, the common duct was explored in 38 per cent and a common-duct stone was recovered in 19 per cent.

SUMMARY

A comparison is made of the symptoms of the two common causes of obstructive jaundice, namely common-duct stone and carcinoma of the head of the pancreas.

The diagnosis of obstructive jaundice can usually be made from the symptoms and physical examination without the necessity of numerous special laboratory tests.

Surgical treatment should follow the diagnosis of obstructive jaundice caused by carcinoma regardless of the hopelessness of the preoperative diagnosis, because a calculus may be found. The beneficial effect of short-circuiting operations in the treatment of obstructive jaundice from malignancy warrants this procedure.

A valvular cholecystgastrostomy has been recommended as a short-circuiting operation to prevent gross regurgitation of the gastrointestinal contents into the biliary passages in an effort to avoid ascending biliary infection.

The common bile duct was explored in 38 per cent of 389 consecutive operations for cholelithiasis, and a common-duct stone recovered in 19 per cent.

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THE TREATMENT OF ALCOHOLISM*

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RECENT investigations of the physiology, psychology[1] and pathology[2] of alcoholism have rekindled medical interest in a subject which a few decades ago seemed to interest only the moralist and the reformer. The expense involved in caring for the increasing number of patients admitted to general hospitals because of alcoholism[3] has also awakened public concern[4] in the matter.

Formerly heavy drinking was considered as a mode of behavior entirely apart from the general background and mental attitudes of the patient. Medical treatment was symptomatic. The cure of the "drink habit" was considered almost out of the sphere of medicine. Today it is recognized that alcoholism is a symptom[5] of underlying psychologic or social maladjustments. Psychotherapy, in properly selected cases, is in many cases curative.

ACUTE ALCOHOLISM

Acute alcoholism is frequently encountered in chronic drinkers[6] but quite often occurs as an isolated phenomenon in an individual who has overestimated his capacity for alcoholic beverages. The flushed face, dilated pupils, injected conjunctivae, thick speech, staggering gait and ataxia of the acute inebriate are familiar to all. Many factors, however, are involved in determining the effect of a given quantity of alcohol in any individual.

Since alcohol is uniformly distributed throughout the body, modified only by the solubility of alcohol in various kinds of tissue, the greater the weight of the subject the less the effect of a given dose will be. Thus, a 50-cc. portion of absolute alcohol or its equivalent taken as whiskey, beer or wine will reach a higher concentration in the blood and nervous system of a 125-pound subject than in one whose weight is 200 pounds. The alcoholic content of whiskey being approximately six times that of beer, it is obvious that six times as much of the latter must be ingested in order to obtain an equivalent amount of alcohol. However, other factors than mere dilution are involved in the differences observed in the intoxicating qualities of different alcoholic beverages. It has been noted[7] that even if gin or whiskey is diluted with water so that the alcoholic content of the mixture is the same as beer, the effect of the gin or whiskey in rapidly elevating the blood alcohol level when ingested on an empty stomach is greater than an equivalent amount of alcohol in beer. This is probably due to buffer substances in the latter which slow its absorption.

Food in the stomach, especially food containing fat, such as cream, butter, bacon and so forth, also measurably slows the absorption of alcohol and results in lower but more sustained elevations of blood alcohol, and similarly diminishes the degree but may prolong the duration of intoxication.

Fatigue, recent infections, exposure and general debility all render the individual more susceptible to the intoxicating effects of alcohol. It also appears that there is definite tolerance established in persons who use alcohol regularly, so that they are able to drink a given amount with less intoxication than can non-habituated persons.

Pathology

There are few postmortem findings which are peculiar to acute alcoholism. Invariably there is hyperemia of the cortical gray matter associated with edema and flattening of the convolutions of the brain, but this may be seen after other types of poisoning. A chemical analysis of the brain tissue is the only approved way to establish the presence and quantity of the responsible agent, and such an examination is usually required by the medical examiner.

Management

Although acutely intoxicated persons sometimes require medical care, the vast majority recover without such assistance. Of those who must be cared for by physicians, most suffer from medical and surgical complications, largely of traumatic origin. Deaths, when they occur, are more commonly the result of the complications than of the acute medullary depression and respiratory failure which alcohol can produce. The treatment of complicating conditions is foreign to this discussion and has been considered under the appropriate divisions of this work.

In uncomplicated acute alcoholic intoxication, the chief measures of therapy must aim to increase the oxidation of alcohol, to promote elimination, to restore depleted water and mineral reserves and to produce sedation. Gastric lavage should never be used in comatose or unconscious patients because of the danger of introducing fluid into the

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lungs and increasing the respiratory embarrassment already present. Its use in conscious patients is debatable. Many cases of pneumonia in alcoholic patients who have been so treated have resulted from such procedures. When the blood alcohol concentration approaches the fatal level, that is 500 mg. per 100 cc., the respiration is very slow and shallow and the use of carbon dioxide and oxygen mixtures is recommended to stimulate breathing. Caffeine sodium benzoate, strychnine and picrotoxin in appropriate doses provide useful agents to stimulate the patient generally.

During the entire course of treatment the patient must be kept warm, since a vast amount of heat is lost through the dilated skin vessels. In the early stages of intoxication there is a misleading subjective feeling of warmth, for blood is drawn from the visceral to the peripheral areas, causing considerable heat loss from the skin. If vomiting has occurred early the course of the intoxication is limited, but the loss of gastric hydrochloric acid from repeated vomiting may be serious. There is a measure of acidosis as a natural result of intoxication, but not sufficient to counteract a severe alkalosis from vomiting. Fortunately most patients with acute alcoholic gastritis are achlorhydric. Within a few hours after the gastrointestinal tract is free of alcohol, the blood alcohol concentration falls and consciousness is regained.

Frequently the physician's aid is not sought until the acute period is passed. Then the "hangover" is the chief complaint, and this requires essentially different treatment than does acute intoxication. A liquid diet is recommended, although the patient seldom wishes to eat at all. Fifty grains of bicarbonate of soda, ½ oz. of saturated magnesium sulfate or two Seidlitz powders and 10 gr. of aspirin may be prescribed. At this stage various sedative and analgesic drugs may be useful, as well as carbonated and mineral waters and fruit juices. If the patient is very restless, 3 to 4½ gr. of Sodium Amytal or 1½ to 3 gr. of phenobarbital may be necessary in order to quiet him. Rest and sleep are essential. The relaxation following intoxication may cause a prolonged sleep, which is desirable provided the sleep is natural.

In cases with coma persisting for twenty-four hours or longer the prognosis is ominous.

CHRONIC ALCOHOLISM

Opinions as to what constitutes chronic alcoholism vary widely. At one extreme stand those who maintain that the daily moderate use of beer or wine at dinner constitutes chronic alcoholism, while at the other extreme are those who insist on constant intoxication as the criterion for such a diagnosis. I reserve the term "chronic alcoholism" for those individuals whose drinking interferes in their normal occupational and social activities, whether this occurs constantly or periodically. Further division of chronic alcoholic patients into two groups may be made. In the first group are the constant steady drinkers, the "addicts," who most generally commence the day with a drink on awakening. These individuals drink not only to relieve psychologic distress but also to overcome symptoms resulting from the previous day's alcoholic intake. In their treatment therefore are two problems: the relief of the symptoms due to alcohol and the relief of the symptoms (physiologic or psychologic in nature) which led them to alcoholism. In the second main group of chronic alcoholic patients are the periodic drunkards, who go on sprees which may last for days, weeks or months, but who are continent drinkers or even abstainers between bouts. In these patients psychologic problems are dominant and the results of psychotherapy are most gratifying.

Pathology

In chronic alcoholism the actual damage to the nervous system usually results from nutritional deficiencies rather than from the toxic effect of alcohol on tissues. These may be due to the neglect of proper diet or to the improper absorption of food resulting from chronic gastritis and intestinal and metabolic changes. The increase in vitamin requirements necessitated by the high caloric value of alcohol is usually neglected. Death in chronic alcoholism may be due to trauma,—subdural hemorrhage is common,—or it may result from intercurrent infections. In these cases, the pathologic changes are peculiar to those conditions. Death may occur in the course of neurologic disease which develops after a long period of drinking. This may take the form of polyneuritis or even frank psychosis. The histologic picture in polyneuritis is one of central and peripheral neuronitis with swelling of the ganglion cells, especially in the motor or frontal cortex and the motor horns of the cord, accompanied by degeneration of the nerve fibers, predominantly of the myelin sheaths in both the peripheral and the central nervous systems. It appears probable that the polioencephalitis superior of Wernicke, as well as the Marchia-Fava syndrome in chronic alcoholism, is the result of dietary deficiencies.

Medical Treatment

It must be again emphasized that the main organic damage inflicted by alcohol on the human nervous system is due to nutritional deficiencies rather than to primary toxic injury from the alcohol

itself. The immediate treatment requires that a diet well balanced and adequate in minerals, protein and vitamins be taken. Usually it is necessary to supplement the diet with additional vitamins. Thiamin chloride is useful in doses of 5 to 10 mg. daily.

Sedatives, such as 15 gr. of sodium bromide or ½ to 1 gr. of phenobarbital given three or four times daily, may be of value in combating the withdrawal symptoms encountered in the chronic alcohol addict.

In recent years amphetamine (Benzedrine) sulfate has been used successfully to counteract the depression and let-down which follows the complete withdrawal of alcohol.[8] The use of this drug produces a mild elation for several hours. Ten milligrams twice daily by mouth has been found effective. Whether the benefit seen among alcoholics who are given the drug results from psychologic or physiologic factors is uncertain, but in many cases its use is followed by improvement.

Psychological Treatment

When there is marked deterioration of personality and the development of psychotic behavior, the patient should be examined by a psychiatrist if possible. In many circumstances this is impossible and psychiatric handling of the case must be undertaken by the general physician.

Before psychotherapy is begun, it is essential that the patient should have become alcohol-free following such symptomatic measures as will calm him, enable him to rest, restore normal elimination and permit him to regain normal fluid balance. The recent memory of the unpleasant symptoms associated with intoxication may be adequate to restrain the patient from drinking for a few days, but memory soon dims, and unless a new program of activity is outlined the cycle of drinking is begun again. The importance of physical well-being as a fundamental step in promoting mental stability is one of the most basic truths in psychiatric ideology, and should be utilized at this point.

A number of separate trends in the treatment of alcoholism are now being followed by psychiatrists, psychoanalysts and specialists in internal medicine who are interested in the application of psychology in therapy with particular reference to personality factors and the "mind-body" problem. Patients with neurotic personalities and immature emotional development are the ones who respond most favorably to psychological treatment.

Those patients with psychopathic personalities who may be pathological liars should not be included in the group considered suitable for psychotherapy, nor should one include patients suspected of being psychotic in the clinical sense. Psychotherapy has not been very successful in the treatment of schizoid individuals who are also alcoholic, or patients in the manic-depressive group. Mental defectives and cases of constitutional psychopathic inferiority are not promising subjects for psychotherapeutics.

An unhappy childhood, especially where one or both of the parents have been alcoholic, may predispose the individual to the behavior pattern of drinking. The social and occupational history, the patient's attitude toward himself and to his environment are the best criteria of selection for treatment. For patients whose history suggests deep-rooted, unconscious difficulties psychoanalytic treatment may be more suitable.[9] These cases may be differentiated from cases appropriate for less intensive psychotherapy. The intelligence and cooperation of the patient require careful consideration before any psychotherapy is recommended.

The general attitude toward a chronic alcoholic must embody the concept that his condition is tantamount to a mental illness and that his personality has been damaged at some time. The pattern of drinking belongs in the realm of symptomatology. One of the chief errors in the past has been to consider the problem of drinking as an entity without consideration of the patient's total personality in its situation.[10] His thoughts, emotions and reactions must form the material of therapy. The drinking as behavior may then be evaluated in its true significance and usually as a symptom.

In any science a method is valid only in so far as it is appropriate for use with the material under examination. A single chemical analysis cannot be applied for all substances. Likewise one particular method of treatment may be most applicable to one particular type of alcoholic patient. Much important clinical and psychiatric investigation remains to be carried out along these lines in order to answer many questions that arise in this connection.

Preventive measures can be easily formulated, but they are difficult to realize in practice. Education of the young on the use and dangers of alcohol may help in certain cases, but there is also the possibility that it may only serve to stress the fact that drinking is a socially approved form of behavior. A rational program of mental hygiene in childhood along with the warmth of affection and the satisfactions and security of normal family life are the best safeguards against the development of alcoholism. The facing of and adjustment to reality, the building of character and the maturing of a normal personality are more likely to be accomplished under such conditions. The

acceptance of life, of things and of conditions as they are and the fitting of oneself to them assist achievements in personality development that may well prevent the formation of neurotic patterns in general and of alcoholism in particular.

In addition to the features already mentioned, other traits and characteristics should be considered in the selection of patients. Personality traits that are significant in selection are: self-confidence or lack of it, feelings of inadequacy, resentfulness, timidity, irritability, easy fatigue, stubbornness and exceedingly strong powers of rationalization. Each of these, present or absent in varying degrees, alters the clinical picture enormously and renders its interpretation and appraisal often very complicated in individual cases, especially in regard to prognosis. A strong ability to rationalize is perhaps the commonest characteristic of the alcoholic with a neurotic personality. The physician must learn to deal with it effectively so that in the course of treatment the patient may come to recognize for himself his own psychological mechanisms. These are often hysterical in their form and dynamics. The tension of anxiety must be recognized, for too often it is a symptom physicians tend to overlook or undervalue. If the patient gives evidence of physiologic disturbance of the nervous system when he lacks his customary amount of alcohol, he is apt to be suffering from anxiety. Drinking is fundamentally thought to be an escape mechanism, and as such becomes a handy defense against underlying anxiety. When in the course of treatment the patient is able to regard himself in a non-aggressive way, or with good insight, anxiety may diminish, and the need for a defensive or dissociative attitude may be lessened.

The chief danger in selecting cases for treatment lies in what may for lack of a better phrase be called the insincerity of the patient. Only from experience can the value of the patient's insight toward himself and the external world be judged. Excessive eagerness for treatment and unusual co-operation by the patient in the beginning are not always good signs. In general, the prospective patient must be evaluated in the same way that all neurotic individuals are appraised. The therapist must try to determine how much "normal" or "healthy" ego the patient may be able to direct toward the "neurotic" or "sick" part of the ego. One authority (Hendrick[11]) speaks of this as "ego potentiality."

It has been frequently stated: "The patient must have *some* insight. If he does not want to get well you cannot *make* him"; "You can lead a horse to water, but you cannot make him drink"; and so forth. In sensing and dealing with these elements and their implications obviously the imponderable factors of intuition, skill and art play important parts in the situation.

It must be remembered that although the patient may have taken to alcohol as a pattern, one may assume that he might have "chosen" a specific or general fear, an obsession or a compulsion. In the first interview one can attempt to estimate the strength and sincerity of the patient's desire to recover. It may be that a trial period of treatment is advisable with the understanding that the patient is not obligated to continue unless he wishes. A general history should be taken, including particularly the facts about the patient's social life, his work and his general habits. Corroborative information obtained from relatives and friends is sometimes helpful and revealing, as it can serve as a control for the veracity and objectivity of the patient's own statements. In some cases, of course, it is not possible or advisable to obtain this information.

In addition to catharsis and suggestion the aims of the treatment should be to redirect thinking into positive channels, to establish good and regular habits and to educate the patient to get along without alcohol. This is done by and with the development of a special relation of confidence between the patient and the therapist, sometimes called the "transference" relation, which is extremely important to success. The treatment of the patient may take many hours or may extend indefinitely. During this time an attempt is made to help the patient learn to relax without the use of alcohol. Physical activities, competitive or group sports (also dancing) and recreational facilities can be utilized to great advantage. He may be given strong suggestion that he will become increasingly able to handle his problem and that he can do this for himself (he must not take treatment "for the sake of someone else"). He should be encouraged to think positively at regular times during the day. Some patients are helped very much by positive autosuggestion. A routine should be planned for every hour of the day, and written down for frequent reference. Plans may be discussed and evaluated from time to time, and may be changed as circumstances require. Throughout the treatment, it must be emphasized that extraneous and apparently non-pertinent material will enter the treatment situation, but this may often be used in a constructive or educational way. The thought of alcohol and past pleasures will come and go, but may be utilized in relation to their consequences in the patient's place in life.

His rationalizations should be revealed to him insofar as it is possible for him to see them in himself.

Above all, the patient's life history must be analyzed, not necessarily in the intensive psychoanalytic style, but in the broader and more empirical psychotherapeutic way. Incidents, emotions, thoughts and events of the patient's life should be re-examined, and interpretations may be given for them as the patient becomes able to accept them. This inventory of the personality may be simple or complex according to the intelligence of the patient. It is, however, exceedingly important, and one of the crucial features of the whole procedure. The therapist should encourage the patient to wish to look at himself objectively, directing his thought toward unconscious as well as conscious levels. The patient can sometimes be led or influenced to desire to change himself. For drastic changes he must have courage and patience in order that he may face the potentialities of this unfolding of his larger and (it is to be hoped) more mature personality.

The therapist himself needs certain qualifications if he is to succeed in treating alcoholics. Some successful therapists were themselves at one time alcoholic, but this is not a necessary qualification. The best instrument in the armamentarium of psychotherapy is self-knowledge. Recently an article[12] appeared that commented pointedly on "therapeutic endowments." It listed:

> A wide and certain knowledge of men in the same sense that, for instance, the successful man of affairs understands that expression.
>
> An ability easily to transcend one's own private self (self-objectivation).
>
> Certain ethical character and intelligence traits which seldom occur in one person, including freedom from infantile and neurotic tendencies.
>
> An inborn call to leadership or what Prinzhorn calls "instinctive vital conviction of direction."
>
> The self-confidence of a free manhood which is not to be gained by any intellectual means, but solely by self-proving with the complete co-operation of the personality.

Occasionally the family is the greatest obstacle in the progress of treatment. Often its members must be educated not only to the present condition but to the more mature development of the patient. Frequently a wife, for example, has adjusted herself to the neurotic personality of the husband and has become accustomed to his immature or unstable behavior. If the patient becomes more mature during treatment,—and sometimes more aggressive,—she needs preparation to face these alterations in the expression of his personality. The family should be prepared to expect relapses, and should be warned against overoptimistic promises from the patient. They must be especially cautious of the patient's false sense of security, which may frequently become manifest and complicate the situation.

There is controversy in this, as in every field of inquiry. Whether to taper off or stop drinking suddenly is a much mooted question. A slow reduction of alcohol is widely recommended, for by this process the patient himself determines his behavior, without coercing him. Some therapists feel that a complete halt in drinking is of major importance. Some substitute soft drinks or fruit juices. The therapist should never scold or nag the patient or comment on it in any way that suggests bringing moral pressure to bear on him.

Some therapists[13] treat patients by first changing or simplifying the environment. Interesting results have been obtained by Wayne Sarcka on his ranch at Cuttingsville, Vermont, by this method. Any plan may have certain advantages, but generalizations are fallacious since each alcoholic case may be different. Sometimes therapy is successfully carried out by office visits. The question of voluntary or forced treatment is also important. It is natural for relatives to want to force therapy on the patient, but if the alcoholic patient is neurotic his problem is not wholly a question of behavior. It may be advisable in some cases to force treatment, unless the need of a dramatic change is unconvincing. The decision between psychoanalysis and psychotherapy[14] should be made by a competent psychiatrist, in consultation with a psychoanalyst, and to some extent must depend on practical considerations.

* * *

These are the basic features of the treatment of alcoholism. The problem of alcoholism is complex, and the statement of William James that no generalizations are better than the details on which they rest must be kept in mind as an epigram of definite significance where alcoholism is being considered.

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REPORT ON MEDICAL PROGRESS

THE TREATMENT OF FRACTURES

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THE treatment of fractures was given its greatest impetus during the World War. This is perfectly natural, since the demands for adequate treatment of wounded soldiers were great. To cope with the unparalleled situation, the entire surgical world was forced to focus its attention on the best ways and means of treating fractures as well as other surgical conditions. Thus many improvements appeared during the War, such as the universal recognition of the Thomas arm and leg splints, the development of skeletal traction, the use of Carrell–Dakin solution, the importance of first-aid splinting before the wounded man was transported, and so forth. All these phases of fracture treatment and many others were a distinct improvement over older methods, and because of them, mankind has been reaping the benefits ever since.

I shall not attempt a review of the treatment of fractures, or dwell upon well-established and accepted methods of treatment, but rather make mention of only those elements that have shown progress or pointed toward improvement in the handling of fractures during the past twenty years. To my mind, the evolution of fracture treatment has been outstanding, and while it was most rapid during the days of the World War, it has continued with new solutions of old problems and better results as time goes on.

I shall mention first the fractures of the upper extremity; then those of the skull and trunk; and lastly those of the lower extremity.

Fractures of the fingers still remain a very serious problem, especially when complicated by infection or joint involvement. Unfortunately, in many hospital clinics, finger fractures are not given the importance they deserve and are frequently treated as minor cases by the intern or resident surgeon. This is a grave mistake and accounts not only for the many crippling results that are too often apparent, but also for the fact that little if any progress has been made in the treatment of finger fractures. In certain cases, where traction on one or more phalanges is of paramount importance, it is now customary to drill Glover's surgical needles or fine short Kirschner wires through the distal phalanges and utilize skeletal traction in this way. Of course this form of traction is effective only if associated with a cock-up splint in which a wire finger splint or a banjo splint is incorporated. When ultimate stiffness of finger joints or ankylosis is feared, the splinting must be so designed as to maintain the involved fingers in the optimum positions for function. The substitution of skeletal traction for adhesive plaster traction in the treatment of difficult finger fractures is the outstanding improvement in our treatment of them so far. When the fractures involve the phalangeal joints, the question of operation often has to be considered, and such a decision requires the very best of surgical judgment. No set rule can be laid down as a guide for all cases.

Fractures of the metacarpal bones do not, as a rule, present a difficult problem, but one type should be mentioned which often is difficult to reduce properly. I refer to the metacarpal fracture with marked dorsal angulation, the kind that a roller bandage in the palm only accentuates and traction on the corresponding finger also fails to straighten out. This fracture in an adult frequently results in marked deformity and some disability unless open reduction and fixation of the bone fragments is accomplished. Within the last few years, suitable fine instruments and fixation materials have been made purposely for fractures of the small bones of the body, and with these, such intractable fractures can now be successfully treated by operation.

The commonest injury of the carpal bones is fracture of the scaphoid. We have now learned the necessity for rigid immobilization of this fracture over a prolonged period, inasmuch as there is a marked tendency to nonunion, but what is not stressed so much as it should be is the technic of immobilization. Fractures of the scaphoid should be held in a plaster cast that includes the proximal phalanx of the thumb as well as the palm of the hand, with the wrist in a position of dorsiflexion and radial deviation. The inclusion of the thumb is essential and constitutes one of the striking improvements in our treatment of this fracture.

If after immobilization for four months there is pain and disability, with clinical and x-ray evidence of nonunion, operation is indicated, or if early postreduction x-ray photographs show that the fragments are not in close contact, it is useless to continue immobilization alone, and open

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reduction with bone pegging or drilling is called for.

The proper operative procedure for nonunion of the scaphoid is still a debated point, some surgeons preferring simple drilling of the fractured fragments and others the employment of a bone peg or graft. So far as is known at the present time, both operative methods seem to be successful in obtaining union.

In fractures of the lower end of the radius (Colles' fracture), reduction is best maintained in the great majority of cases by placing the forearm and wrist in the Cotton–Loder position. However, this position should not be maintained for more than ten days as a rule; at the end of this time the hand is gently brought up into a straight line, the ulnar deviation being maintained, and is again immobilized. In certain cases where the reduction cannot be maintained after splinting, heavy wires or pins have recently been inserted into the bone fragments, and while these fragments are held in their proper reduced position, the pins are incorporated in a casing of hardened material or plaster of Paris. Taylor and Parsons[1] have emphasized the significant role played by the discus articularis in these fractures, and Haggart[2] has very properly stressed the danger of too early mobilization when they occur in the aged. It should be mentioned that the second week is the danger period of this fracture, when the bone fragments have a tendency to slip, and that routine weekly x-ray photographs should therefore be taken during the early stages of treatment.

A word of caution may be given in regard to fractures of the bones of the forearm. When only a single bone, such as the radius or the ulna, is fractured, it is most important to include x-rays of both the elbow and wrist joints, in order to rule out a dislocation of the head of the radius in case the ulna is broken, or a separation of the radio-ulnar ligament at the wrist in case the radius is fractured. It is perfectly obvious that if one of these two bones is broken and shows any degree of shortening, the other bone must either have given way or its ligaments have ruptured.

Usually an accurate reduction of the fracture with restoration of normal bone length will correct the accompanying dislocation at either the wrist or elbow, but to ensure a perfect result open operation with internal fixation of the broken bone fragments is often indicated. Should the head of the radius continue to remain unreduced after accurate reduction of the fractured ulna, open reduction of the dislocation is demanded.

Fractures of the elbow joint are now treated by a greater variety of methods than in the past and with greater success. As a general rule, complete fractures of the olecranon are seldom treated by the closed method any longer, since an open reduction can restore and maintain the normal anatomy and allow earlier motion and improved function. Whether pins, screws, wire or fascia is to be used as a means of internal fixation of olecranon fractures depends on the character of the fracture and the individual operator's choice. The fact that this fracture has come to be considered as one calling for open reduction, if possible, is a step in the right direction.

Certain supracondylar fractures of the humerus extending into the elbow joint with wide separation or displacement of the bone fragments are being treated in these more recent times much more effectively by means of Kirschner wire traction through the olecranon or by open operation. The surgical approach to the elbow joint through its posterior aspect has done much to facilitate the open reduction of these fractures when operation is desired. Fractures of the head and neck of the radius are frequently serious problems that require fine surgical judgment. The general growing tendency is to carefully resect the fractured radial head if it is comminuted or shows displaced fragments, and to do the operation within the first two weeks after injury, since end result studies prove that delayed resections do not give the same good results as early ones. It is therefore probably unwise to wait and see what rotation the forearm will develop before deciding upon operation, if there is much doubt about it in the beginning.

Many new splints have been devised for treatment of fractures of the shaft of the humerus, most of them being of the ambulatory type, but none is suitable for all the various fractures of this bone. Unless the patient is bedridden for some other reason, a fracture of the humerus alone should not be considered as sufficient cause for keeping him in bed. As a rule, the simpler the apparatus, the better. Rogers[3] has correctly stated, "When intelligently treated by any suitable method, the end results of fractures of the humerus are excellent." A word of warning should be mentioned, however, with reference to the danger of nonunion resulting from too much traction or overpull in humerus fractures. Those occurring in the mid or lower third are the ones where the danger of shortening or overriding is of much less consequence than the danger of pulling the bone fragments apart. As a rule, fractures of the humerus can be best treated with the patient up and around, and gravity alone provides sufficient traction to restore bone length. When the fracture occurs in the region of the surgical or anatomical neck,

it is often wise to discard all attempts of splinting, for the advantage that can be gained by early motion. This is especially true in the case of elderly patients, whose surgical neck fractures are often comminuted and are most effectively treated by means of a simple swathe and sling followed by early motion. In those cases in adults where there is a separation and marked displacement of the humeral head that cannot be reduced by closed reduction, an adaptation of the operation of Nicola[4] offers a very ingenious and happy solution of the problem of treatment.

The treatment of fractures of the skull by means of dehydration, when indicated, and repeated lumbar puncture has proved to be a decided step forward in our care of these cases. Craniocerebral injuries are a specialty of surgery, however, in which so many marked advances have been made that the reader is referred to the recent articles of Munro[5] and other writers who specialize in this field.

The one great advance made in the treatment of fractures of the spine during recent years has been the establishment of the fact that these fractures can, almost without exception, be accurately and completely reduced with little or no resulting deformity. The emphasis that has been placed on securing complete or perfect reduction and not being satisfied with a partial reduction has done much to prevent future disability and subsequent backaches in these unfortunate individuals. Numerous excellent methods of obtaining reduction of these fractures have recently been advocated by Davis,[6] Rogers,[7] Watson-Jones[8] and others, and the surgeon is free to choose whichever method appeals to him most. The interesting and gratifying truth that has gradually evolved from experience with fractures of the spine is that failure to reduce completely this type of fracture, when it is seen early, should be considered inexcusable. In those fractures of the spine that are complicated by paralysis of the bladder, the tidal-drainage method[9] of treating the bladder has been an outstanding improvement.

The use of skeletal traction in the treatment of fractures and dislocations of the cervical spine is a distinct advance over our older methods. The most frequently used forms are piano wires through trephine holes in the skull, or skull calipers.[10] Each form has proved both comfortable and efficient.

In fracture-dislocations of the cervical spine, there is at the present time a controversy going on in regard to the necessity of fusing the involved area after the dislocation and fracture have been reduced (Cone and Turner[11]). In view of the fact that relapses have been reported in some of the cases that were not fused, it would appear that the safest procedure to follow is reduction, plus either a fusion operation or a wire or fascial fixation. The latter allows more mobility of the head and neck and in most cases is sufficient for a permanent cure. It is only fair to state, however, that the great majority of these cases, if reduced only and held by some form of external fixation, such as plaster of Paris or a leather head support, will go on to spontaneous fusion without any operative procedure.

Fractures of the pelvis are not difficult to treat as a rule, but can be extremely serious because of their likely complications. When the fracture is unilateral and involves both the anterior and the posterior portions of the pelvic girdle, there is usually a raising or lifting of the entire broken segment, causing both deformity and inequality of leg length. To correct this situation the "well-leg traction" method of Anderson[12] can be very successfully employed. To use traction on the shortened femur alone, as has been our custom in the past, does not yield as good results and frequently fails to correct the existing deformity.

When the acetabulum is broken and the pelvic wall has also been comminuted and pushed in, causing an intrapelvic protrusion of the femoral head, one can now frequently restore the normal anatomy and obtain an excellent reduction by placing the patient's trunk and normal leg in a plaster cast and applying Kirschner wire traction in the great trochanter of the affected side and pulling laterally in the direction of the femoral neck. This type of fracture has often been neglected or inadequately treated, but should no longer be considered irreducible, since in experienced hands under proper treatment, reduction is possible and the end results are most gratifying.

The most outstanding advance made in the treatment of any one fracture during the past generation has been the work of Smith-Petersen[13] on fractures of the neck of the femur. Owing to his conception of accurate reduction combined with firm internal fixation, this fracture, which had hitherto been considered the unsolved fracture of the human body, can now be expected to result in bony union with excellent function in 80 per cent of cases. Since the percentage of successful results with the older methods had never exceeded about 50 per cent, remarkable progress has been made. Numerous methods of internal fixation have been advocated by others, in the form of nails, wires and screws, since Smith-Petersen originally introduced his ingenious three-flanged nail, but none have succeeded in surpassing his brilliant results. Since writing his original article Smith-Petersen has changed his operative technic and no longer exposes the fracture by opening the hip joint, but after accurate closed reduction, nails the broken

fragments through a trochanteric incision under the guidance of visualization by means of anteroposterior and lateral x-rays.

Fractures of the shaft of the femur have been much more efficiently treated since the introduction of skeletal traction. The inadequacy of adhesive plaster on the skin as a form of traction has become so increasingly manifest that most recent writers condemn its use for this purpose. However, there are those who would make an exception to the wholesale discarding of adhesive plaster for traction purposes and believe that in one form of traction alone (Russell traction) adhesive plaster can still be considered efficient.

Russell traction has recently become a well-known method of treatment in fractures of the femur. It has borne the test of trial since its introduction by Russell in 1924; in many respects has distinct advantages over other methods, and no one can deny that it is the most comfortable. Also, since it does away with the usual forms of splinting it facilitates nursing and bed care. For fractures in and about the hip joint requiring preparation for operation or wound dressings, this method of traction as a protective measure is by far the most comfortable, convenient and effective. Many prominent surgeons advocate Russell traction for all fractures of the femur, while others believe it is suitable only for those that involve the mid and upper portions of the femoral shaft. Certainly there is a very decided opinion in most fracture clinics that for supracondylar fractures of the femur it is not applicable or effective and should not be used. It is only fair to state that Russell traction, while still in its trial stage, has won many adherents with the passing of time; but for fractures that require heavy pull and for supracondylar fractures, it is found wanting. Also it should be stated that in order to be most effective this traction should be applied with mathematical precision, and must be almost constantly watched and adjusted, a feature that is impossible, as a rule, to carry out efficiently in large hospital clinics.

Most surgeons consider Kirschner wire traction as the most effective form of skeletal pull for all fractures of the shaft of the femur, the leg being suspended in a Thomas splint and the knee joint being allowed to move by means of a Pearson attachment. In Europe, however, and in some American clinics, through the teachings of Böhler, the Thomas splint is at present being supplanted by the Braun splint, which serves a similar purpose for hospital patients, but which is not suitable for transportation purposes. From the point of view of economy and of varied usefulness, the Thomas splint still holds first place.

While we are on the subject of fractures of the femur, it is important to mention that supracondylar fractures of this bone are often so difficult to reduce and hold in proper position by any of the ordinary methods of closed reduction and traction that long experience has forced on us, as the treatment of choice, open reduction with internal fixation. In other words, this type of fracture, when occurring close to the condyles with separation and displacement of the bone fragments, should be operated on, if proper facilities are available and if the patient's condition permits. In the great majority of cases much time will be saved and better results obtained by such a procedure.

Fractures of the patella, when complete and with separation of the bone fragments, have become a definite indication for operation. Most surgeons prefer the use of fascia lata as the best means of fixation. In those cases where the patella is badly comminuted into numerous loose fragments, making an accurate reduction impossible, it would seem far better to excise the patella[14] completely and repair the gap with fascia lata than to allow the broken irregular bony particles to remain and later result in traumatic arthritis of the knee joint.

Another fracture involving the knee joint and deserving special attention is the so-called "bumper fracture" that comprises a depression of a portion of either the outer or the inner table of the tibia, which, if not completely corrected, results in either a knock-knee or bow-leg deformity, with marked weakness of the joint. This fracture has been considered much too casually in the past, probably because the x-ray picture fails to give an adequate conception of the damage present in the joint. We have been in the habit of thinking that early motion was the one and only indication of treatment, and that this would yield a fairly good result. In this we have been entirely wrong. Cotton recognized the very poor late results in these cases and suggested an attempt at reduction of the depressed fragments by pounding them back into position by means of a felt pad placed on the skin over the displaced fragment and struck with a mallet. This method has not been successful, and never can be, since we now understand the mechanics of the deformity. The only adequate method of treating bumper fractures of the tibia with deformity is that of open operation and fixation, as shown by Barr;[15] and the aftercare, in order to be effective, must include a protective steel walking splint; otherwise, deformity may recur and the benefits of operation be annulled.

Fractures of both bones of the lower leg still remain a problem of treatment. There is no one

method of splinting or traction that is suitable for all cases. Usually, traction is best obtained by a Kirschner wire through the os calcis, and the danger of rotation of the bone fragments on each other is overcome by supporting the fracture with the knee flexed. But this type of treatment in a Thomas splint or Braun frame is sometimes found to be inadequate because it still allows too much mobility at the site of fracture. For this reason, a posterior plaster of Paris shell should be molded to the flexed leg from the tips of the toes to the midthigh to aid in immobilization, while traction is being carried on. The danger of too much pull's resulting in delayed union or nonunion must of course always be avoided.

The two-pin method of treating these fractures, as first advocated by Böhler,[16] seemed to be an improvement over our older methods, but as time has gone by two main dangers of the method have appeared, namely sepsis about the pinholes and nonunion, which have discouraged its use even in the hands of Böhler himself. More and more, it can be said, there is a tendency to treat fractures of these two bones by open reduction and internal fixation, either immediately or after swelling and ecchymosis have subsided, and this tendency, I believe, is in the right direction.

The treatment of fractures by the use of steel pins, driven through the bone fragments and then incorporated in a plaster casing, has been popularized in this country by Anderson,[17] who has devised a number of ingenious splints for this purpose. In all fairness to the inventor, it should be stated that the mechanical conceptions of his methods are excellent, but that in the hands of general practitioners and of the surgical profession at large the method is dangerous. Even with the greatest of care, sepsis and nonunion are all too frequent accompaniments, and make the risks of the procedure outweigh its advantages.

There have been no new outstanding developments in the treatment of ankle fractures. Accurate reduction of the fracture, with special attention to the anatomic relations and alignment of the ankle mortise, and a snug-fitting plaster cast seem to remain the desired end. In cases where the tibial articulating surface is split and separated or displaced, it is of paramount importance to obtain an accurate hairline reduction in order to secure perfect function and prevent subsequent traumatic arthritis. In such cases operation is indicated, and here, as in all joint fractures, nothing less than a perfect reduction with fixation should be considered satisfactory. Progress in the treatment of fractures has made it a maxim in surgery that to operate on a joint fracture and secure only a partial reduction is to fail, and this rule applies to every joint in the body.

Of the various fractures of the tarsal bones, those of the os calcis have created the most serious problems. We have yet to find an adequate and satisfactory method of treatment for fractures of this bone. It is likely that no one method will ever serve and that, in many cases, closed reduction plus subsequent arthrodeses of the subastragalar and other tarsal joints will be necessary. The fact that fractures of the os calcis so frequently involve the subastragalar joint makes them a complicated problem. The methods of treatment advocated by Böhler[18] and Hermann[19] are suggested as being the best to follow at the present time.

In a discussion of this subject, one should include epiphyseal injuries and mention the excellent work of Aitken,[20] who has shown why certain epiphyseal injuries will result in deformity and cessation of growth and others will not.

Also, some mention should be made regarding the improvement in steel fixation materials used in the treatment of fractures. Definite progress has been made in the discovery of certain alloys that are tolerable to the tissues of the body and do not produce electrolysis or corrosion. Outstanding among these is the alloy, vitallium, which was introduced into the field of fracture therapy by Venable.[21] Vitallium is of all known metals the least irritative to the body tissues, and for many surgical procedures is ideal. Its one and only known defect is its brittleness, which precludes its being sufficiently strong and tough for the plating and screwing of large bone fractures. The best material for bone plates and bone screws now known is stainless steel, but whether it will continue to remain so is not at all certain. Much research is being carried on at present in an attempt to determine this point.

The recent history of fracture treatment would not be complete without stating that it has been passing through an era of gadgets. This is to be expected in a mechanical age such as ours, and we find fracture literature filled with suggestions of treatment by one mechanical device after another. Most of these gadgets have complicated rather than simplified the treatment of fractures, and they have purposely been omitted from this article, since it is believed that only a very few if any of them will survive the test of time.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 25391

PRESENTATION OF CASE

First Admission. A thirty-eight-year-old housewife entered complaining of abdominal pain.

At the age of fourteen years she was ill for two or three months with what her physician believed to be either typhoid fever or tuberculous peritonitis. At that time she had fluid in her abdomen, and her spleen was enlarged. During the past eight years she had had indigestion, soreness in the lower abdomen, gaseous eructations, and heartburn. About once every six months she had sharp pain in the epigastrium which was relieved by taking castor oil or by induced vomiting. These attacks came on two or three hours after meals and lasted about two days. She had had no tarry stools or hematemesis. Four years prior to entry she rather suddenly became nauseated and vomited about one third of a large water pitcherful of dark-brown material. There was no pain. Two hours later she became unconscious for a short time and then vomited a "lot" of bright-red blood. She passed tarry stools for two weeks, was very weak and remained in bed for seven weeks. X-ray photographs were taken by her physician and a diagnosis of duodenal ulcer made. She was put on a bland diet and after six months had regained most of her strength. At no time did she have pain.

Nine months before admission, although she had been feeling very well, she suddenly became nauseated, felt weak and perspired freely. The following morning she noticed that her stools were black and they remained so for two or three weeks. Two months later she had two successive hemorrhages, vomiting dark blood on the first occasion, bright-red blood on the second. Each attack was preceded by nausea and weakness. Following these she had severe abdominal pain over the left upper abdomen, right upper abdomen and right side. It felt like a belt constricting her upper abdomen. The pain usually began about 1 p.m. and lasted several hours, requiring morphine for relief.

Six months preceding entry her ankles and lower back became swollen and soon her arms, hands, feet and abdomen were swollen, the abdomen being quite hard. She took digitalis and after five or six weeks the edema entirely disappeared.

One month before entry she felt much better but continued to have abdominal pain coming on early in the afternoon. Three weeks later she had x-ray photographs taken which confirmed the diagnosis of chronic duodenal ulcer and enlarged spleen. The liver was not enlarged. During the past nine months she had lost 40 pounds. No jaundice had been noticed. Her bowel movements had been essentially normal except for the blood passed. She had been exposed to tuberculosis. Some shortness of breath on exertion and palpitation had been noted. Her past and family histories were otherwise noncontributory.

Physical examination showed a very anemic, emaciated woman with a rounded tense abdomen. Some small axillary lymph nodes were palpable. Examination of the chest was negative. The blood pressure was 120 systolic, 90 diastolic. The abdomen was tense and tender. The liver edge was palpated at the costal margin. A hard mass came from under the left costal margin and extended almost half way to the umbilicus. A notch could be felt medially. The edge was rounded and tender. Rectal examination showed tender external hemorrhoids.

The temperature was 99.2°F., the pulse 80, and respirations 20.

The urine examination was negative. The blood showed a red-cell count of 3,550,000 with 75 per cent hemoglobin, and a white-cell count of 3800 with 79 per cent polymorphonuclears, 20 per cent lymphocytes, and 1 per cent eosinophils. The blood smear showed the red cells to be normal. The coagulation time was 6 minutes in the first tube, 12 in the fifth. Clot retraction was normal. A blood Wassermann test was negative. The serum nonprotein nitrogen was 25 mg. per 100 cc. Three stool examinations were guaiac negative.

A gastrointestinal x-ray series was negative except that there was slight spasm of the duodenum. Retrograde pyelograms were negative though the left kidney pelvis appeared to be slightly lower than normal.

On the third hospital day the blood showed a red-cell count of 4,300,000 with 65 per cent hemoglobin, and a white-cell count of 2700. Her condition remained essentially unchanged and she was discharged on the tenth hospital day.

Second Admission (two weeks later). The patient had gained strength since discharge and returned for operation. The blood red-cell count was 3,700,000, and the white-cell count 3800. On the fifth hospital day a laparotomy was done. There was no free fluid in the abdomen. The omentum was widely adherent to the anterior abdominal wall. The spleen was exposed with difficulty and was found to be moderately en-

larged and very adherent. The liver and stomach were also buried in vascular adhesions. The duodenum could not be well exposed, but there was no obvious abnormality. It was felt that nothing further could be safely done and the abdomen was closed. She did well following operation and was discharged on the twenty-eighth hospital day.

Third Admission (eight years later). Since the last admission the patient had gained 30 to 40 pounds and felt well until five days before reentry. At this time she developed "shingles" of the face and neck and took some pills given by her physician. These upset her on the day before admission and the following morning she vomited a large amount of blood and dark-colored material.

Physical examination showed herpetic lesions and crusts over the right side of the face, neck and head. Examination of the chest was negative. The blood pressure was 95 systolic, 75 diastolic. The abdomen was soft. The spleen was palpable 4 cm. below the costal margin and was firm. The liver edge was just palpable on inspiration. There was a well-healed midline scar. Rectal examination showed hemorrhoids.

The temperature was 99°F., the pulse 80 and the respirations 20.

The urine examination was negative. The blood red-cell count was 3,200,000 with 55 per cent hemoglobin, and the white-cell count 4600 with 87 per cent polymorphonuclears. The clotting time was 10 minutes in the first tube, 12 minutes in the fifth. There was little or no clot retraction after 24 hours. The bleeding time was 1½ minutes. A blood Hinton test was negative. A van den Bergh was too low to read. Three stool examinations were guaiac positive.

For the first three weeks in the hospital she ran a daily afternoon temperature of 100 to 101°F. On the fifth hospital day her red-cell count was 1,890,000, with 40 per cent hemoglobin. The platelets were greatly decreased. The red cells showed moderate variation in size and shape but were well filled with hemoglobin. She complained often of abdominal pain and distress. Fifteen days later the blood white-cell count was 4300. She was given daily doses of ferrous sulfate. On the thirtieth hospital day her blood showed 7.5 per cent reticulocytes, and 2,280,000 red cells. She gradually improved, her temperature subsided and she was discharged on the thirty-fifth hospital day.

Fourth Admission (two years later). Nine months after discharge the patient had another episode of weakness and tarry stools. Four days before entry she again had black stools and on the following day fainted when she arose to go to the bathroom. On the day before entry she vomited red blood mixed with food particles. She had been taking digitalis for moderate dyspnea on exertion and in addition Blaud's pills.

Physical examination showed no new findings. The blood pressure was 120 systolic, 80 diastolic. The temperature was 99°F., pulse 88, respirations 20. The urine examination showed a large trace of acetone but was otherwise negative. The blood showed a red-cell count of 3,700,000 with 60 per cent hemoglobin, and a white-cell count of 8100 with 79 per cent polymorphonuclears, 15 per cent lymphocytes, 1 per cent eosinophils, 2 per cent young polymorphonuclears, and 3 per cent unclassified cells. There was 4.9 per cent reticulocytes. The red cells showed moderate achromia, considerable variation in size and shape. There were rare stippled cells and a rare macrocyte.

The patient continued to pass blood by rectum and on the ninth hospital day the red-cell count was 1,800,000, the reticulocytes 8.9 per cent. She slowly improved and was discharged on the thirty-seventh hospital day. She had received one blood transfusion and 12 grains of ferrous sulfate daily.

Final Admission (three years and three months later). Since the last admission she had been reasonably well and active and her weight had remained constant at 136 pounds. She bruised easily, hypodermic injections causing large ecchymoses. For the past year her ankles had shown pitting edema. Two years and again one year before entry she had repeated hematemeses. Thirty-six hours before admission hematemesis recurred and she vomited blood almost every hour until entry.

Physical examination showed an acutely ill restless woman. The skin had a slightly icteric tinge. The chest was essentially negative. The blood pressure was 60 systolic, 40 diastolic. The spleen and liver were just palpable.

The temperature was 101°F., the pulse 120 and the respirations 20.

The blood showed a red-cell count of 2,100,000 with 50 per cent hemoglobin. She was given two transfusions of blood, one of 500 cc. and the other 1000 cc.

She rapidly failed, however, and died on the second hospital day.

Differential Diagnosis

Dr. William B. Breed: The history tells us that between the ages of fourteen and thirty this patient had been entirely well. The existence of such a period of freedom from symptoms is to be doubted if we are to believe that the first illness was the initial appearance of the present fatal condition; and the presence of ascites and

splenomegaly at that time certainly indicates that such was the case. Eight years prior to admission she was symptom free except once every six months when she had sharp pain relieved by taking castor oil. During the last four years her attacks were associated with hemorrhage.

"She had been exposed to tuberculosis." I do not know how much emphasis to place on that.

DR. TRACY B. MALLORY: A maternal grandfather died of tuberculosis. Nothing is said about the duration of the contact.

DR. BREED: Of course, both such observations (ascites and splenomegaly) are difficult to be certain of, particularly in a child. My experience has been that it is most difficult to be sure of the presence of both an enlarged spleen and ascites in the same patient. However, we have to assume that she did have both at the age of fourteen because it is written into the record. If that is the case, then it seems unnecessary to believe that at the age of thirty she should begin to have bleeding due to a duodenal ulcer unless we have to make two diagnoses. If you look down over this record I think the diagnosis of duodenal ulcer is not clearly substantiated. We hear twice that an x-ray photograph confirmed the diagnosis of ulcer. Then we later find in this hospital only slight spasm of the duodenum which is certainly not enough for such a diagnosis and her story is not really one of duodenal ulcer. Moreover, she is a woman, and this reduces further the chances of her having duodenal ulcer. So I am ready to eliminate ulcer as a possibility.

We do not know whether or not she had an enlarged spleen during all these sixteen years. I am going to assume that she probably did, and this splenomegaly marked the beginning of her illness. If the spleen was enlarged, what was the cause? My first thought would be thrombosis of the splenic vein with beginning of so-called Banti's syndrome. It is true that it is less common in women than in men, but the patient is of the right age. It does begin in the adolescent period, and it does have periods of remission. I know of no other condition that would last from the age of fourteen through to fifty-one years, her age at the final admission. I hope Dr. Mallory will help us in our point of view about the classification of the splenomegaly. With a disease lasting as long as this has, and starting at the age of fourteen, one has to consider Hodgkin's disease, and amyloid disease, if she had tuberculosis. I cannot believe that we have to include aleukemic leukemia, because of the duration. In the face of the fact that she had no x-ray treatment one would hesitate to make a diagnosis of Hodgkin's disease or any of the serious malignant diseases of the spleen or bone marrow. There is, of course, the giant follicular type of malignant lymphoma, which is benign and lasts a good many years.

DR. MALLORY: The longest duration we have seen in that condition is fourteen years.

DR. BREED: That does not really fit into that category either, and so I keep coming back to the so-called Banti's syndrome which is represented by two points of view, one that there is an underlying cirrhosis to begin with, the other that there is a primary splenic thrombosis which produces esophageal varices. Even though we could not find them by x-ray study I suspect that she bled from a varix rather than from a peptic ulcer, for which we have no good evidence. Certainly we know if she had duodenal ulcer that she had two conditions.

I should like to comment about the swelling of the arms and legs and then note, "She took digitalis and after five or six weeks the edema entirely disappeared." I want to go on record as saying that the digitalis played no part in relieving her of edema. I think it was probably nutritional and that she had no heart or kidney disease.

Although they looked into the abdomen on the operating table, we do not know much more than we did before. I question very much if the surgeon who operated was able to make a definite diagnosis. He could merely observe the physical findings, namely, adhesions and a moderately enlarged spleen, and ascites. I suppose he did not take the spleen out because of the mechanical difficulty. Is that correct?

DR. MALLORY: Yes.

DR. BREED: Would it be possible for a person to make a diagnosis by inspection at operation? Would what is described here lend any support to tuberculous peritonitis?

DR. MALLORY: It is consistent with healed tuberculous peritonitis acquired at the age of fourteen.

DR. BREED: I am still not willing to call it tuberculosis with amyloid spleen.

I assume that she had no bleeding for eight years, and that she felt well. Then she developed herpes zoster and had a hematemesis. I do not believe that the herpes is important.

She presented no skin manifestations of so-called thrombocytopenic purpura at this time (fourth admission). One would think if this were the ordinary purpura hemorrhagica, that one would by this time have found some evidence in the skin. Later on there was some suggestion of it, but I think that it was not a primary lesion.

I do not believe she had a clear-cut disease. I

think that she had had a syndrome for many years which consisted mainly in the persistence of splenomegaly and bleeding from the gastrointestinal tract with, toward the end, some secondary anemia and purpura. The reports of the blood smear do not indicate that this is a primary blood dyscrasia. The anemia was presumably a result of recurring hemorrhage. The whole process was essentially a mechanical lesion due to thrombosis of the splenic vein and varices that bled from time to time, even though they were not shown by x-ray film. I think she did not have a duodenal ulcer.

A PHYSICIAN: Is this spleen unusually small for a Banti's syndrome?

DR. BREED: It is hard to tell how big it was. The only sound evidence that we have of its size is the comment of the surgeon who said it was moderately enlarged. There was a time when it was quite prominent on physical examination and the notch was felt.

DR. MALLORY: There is one point that may well be brought out at this moment. Spleens are variable in size. The spleen after all is like a sponge which serves as a reservoir for blood cells, and any patient who has had a recent severe hemorrhage is apt to have significant shrinkage of the spleen. On most of the subsequent admissions she came in immediately following a hemorrhage. If we had seen her before rather than after these hemorrhages it is possible the spleen would have been much more readily felt.

DR. BREED: I am not going to comment on this point, but I am going to stick to Banti's disease as the essential diagnosis here unless someone has some clear point of view that will discourage me.

DR. MALLORY: I should like to put some figures on the board of the white-cell count over the last fourteen years and ask you about them, Dr. Breed.

ADMISSIONS	WHITE BLOOD-CELL COUNT
First	3800
	2700
Second	3800
Third	4600
	3900
	7500
Fourth	5400
	4000
	8100
Fifth	22,000 (1 hour after hemorrhage)
	6700
	5200

DR. BREED: The point you are trying to emphasize is the persistent leukopenia, and the question whether she had aleukemic leukemia?

DR. MALLORY: What do you think? Do you consider this consistent with leukemia?

DR. BREED: I think one may have leukopenia associated with Banti's syndrome. I quite agree that the white count is low and I think that array of figures is impressive, but she went twenty-one years with no x-ray treatment and no abnormal cells in the smear. They did mention some axillary nodes at one time which might suggest Hodgkin's disease, but I am not familiar with persistent recurring gastrointestinal hemorrhages commonly associated with Hodgkin's disease over a long period of time. I cannot bring myself to think that this is a primary blood dyscrasia in spite of the persistent leukopenia.

A PHYSICIAN: At the time of the 2700 white count there were four million red blood cells.

DR. MALLORY: The red count was two and a half to four million throughout the whole period. It never got up to normal.

I am trying to give Dr. Breed support for his diagnosis, although he appears not to know it.

In going over this story I was greatly impressed by this series of white counts. Although a laboratory examination never makes a diagnosis this persistent leukopenia is certainly most suggestive, and the further fact that at all these admissions the differential count was normal, makes a diagnosis of Banti's disease almost certain. I would start looking for any history that might confirm this, and that which Dr. Breed has worked out for you is correct. We have the two factors both pointing in the same direction. All that makes it a rather strong case.

DR. BREED: To be perfectly honest with you this impressive list of low counts did not at first impress me.

CLINICAL DIAGNOSES

Thrombophlebitis, portal vein with splenomegaly.
Cirrhosis of liver (portal).
Ruptured esophageal varix with hemorrhage.

DR. BREED'S DIAGNOSIS

Thrombophlebitis of splenic vein with splenomegaly (Banti's syndrome).

ANATOMICAL DIAGNOSES

Thrombophlebitis, organized, of splenic, superior mesenteric and portal veins.
Splenomegaly.
Cirrhosis of liver, portal, minimal.
Esophageal varices.
Massive hemorrhage into gastrointestinal tract.
Peritonitis, chronic adhesive, generalized.
Tuberculous adenitis, mediastinal.
Cholecystitis, chronic.
Cholelithiasis.

PATHOLOGICAL DISCUSSION

DR. MALLORY: It seems to me that persistent leukopenia is rarely paid the attention it deserves

on the medical wards of this hospital. An occasional white count of 5400 does not mean anything, but when over a twenty-year period three quarters of the counts are 5000 or below, I think they cannot be dismissed lightly. Only one condition so far as I know will produce that, namely one form or another of obstruction of the portal system. So far as my experience goes it must be that the return of blood flow from the spleen is interfered with and that the spleen is subject to prolonged chronic passive congestion of the most severe sort. Of course the commonest form of portal obstruction is cirrhosis of the liver and two thirds of the cases of atrophic cirrhosis of the liver will show white counts at this level; but it is unlikely that a patient with cirrhosis of any severe degree would begin to have hemorrhages from esophageal varices at thirty and would live to be fifty before the fatal hemorrhage occurred. Almost certainly progressive liver insufficiency would have led to death long before that, and if one chooses to enter the episode at the age of fourteen into this story and say that she survived thirty-six years from onset to death, a progressive cirrhosis would be ruled out completely. On that basis you would have to fall back on purely mechanical stasis in the portal vein or splenic vein.

That is essentially what we found here. The splenic vein immediately in the hilus of the spleen was greatly dilated, but as you traced it back across the superior border of the pancreas it became completely obliterated, and was just a hard fibrous cord. The upper portion of the superior mesenteric vein was likewise completely occluded and the portal vein up to and a little distance into the liver was almost completely occluded. Not very many patients with as much occlusion of the portal vein as that would live thirty-six years, but this patient as you heard from the results of the exploratory operation had a tremendous number of adhesions throughout the abdomen. In other words, she had developed a spontaneous omentopexy which was far better than anything the surgeons could hope to do. I think without any question that it was the collateral blood supply through all these adhesions that allowed her to carry on so long.

Her esophagus from top to bottom was filled with varices. The reason that they were not verified roentgenologically in this case is that Dr. Richard Schatzki had not come to this hospital until the time of the final entry, and she was too ill to put through the examination on this occasion. They would unquestionably have been found on any of the previous occasions when she was x-rayed had the roentgenologist known how to look for them.

The spleen weighed 900 gm., which is fairly large, and the gastrointestinal tract contained nearly a liter of fluid blood. So she did have a fresh hemorrhage before death and it is quite possible that the spleen was even bigger before autopsy. As to what the episode at the age of fourteen was, I do not believe we can say with any certainty. My guess would be that at that time since splenomegaly was noted she had an acute thrombophlebitis of the portal vein which is not so very uncommon in children at adolescence. We do not see very many such cases in the acute stage in this hospital, but from the Children's Hospital Dr. Richard Smith has reported a series of sixteen.

A PHYSICIAN: That is in males; it is unusual in females.

DR. MALLORY: Yes, but you see it in both sexes. However, that may not have been the whole story. I am not certain that that would account for the development of the peritoneal adhesions. We found a rather large mass of tracheobronchial lymph nodes nearly 5 cm. in diameter which contained many old foci of tuberculosis, so it is conceivable that that initial lesion was tuberculous peritonitis. The mesenteric nodes were rather large but not caseous, a fact that is a little against tuberculous peritonitis. I am inclined to think she never had it, but I do not believe I can rule it out.

DR. BREED: With tuberculous peritonitis in a child of fourteen I think it would be uncommon to find a palpable spleen.

DR. MALLORY: I should think so unless the child has miliary tuberculosis in which case it would not survive.

So far as splenectomy goes I have never seen a case survive fifteen years. I have seen cases without splenectomy go twenty-eight years. Esophageal varices are not influenced by the operation and hematemesis recurs just as frequently.

A PHYSICIAN: What about the liver?

DR. MALLORY: It was finely granular and weighed 1100 gm., a little small and there was no left lobe. It is rather characteristic of these cases that one lobe of the liver is missing and the other lobe enormously hypertrophied to make up for the deficit, and I think that means without question infarction during the initial period of the acute thrombosis. I might say that if you take out the spleen the white count goes up to 10,000 and stays there for the rest of the patient's life. Within a day it is up, and leukopenia does not recur. The same thing is true in a patient with cirrhosis of the liver. The white count usually

goes up slightly above normal. However, if these patients develop pneumonia they show a white count of 20,000 or 30,000 as quickly as a normal person.

DR. BREED: We are approaching the point of view here in this hospital then that splenectomy in a case of this kind is not indicated.

DR. MALLORY: I can add one other point to that. In these cases there is a very real danger of operative death from splenectomy, and not merely from the fact that many adhesions may be present and the surgeon may not be able to control the hemorrhage. Quite aside from that, suppose he is a thoroughly capable surgeon and does not take out the spleen, even if he can adequately control the hemorrhage, nevertheless thirty per cent of these cases will develop thrombophlebitis of the portal vein within three or four days and die. That is an inevitable outcome in a significant proportion of cases so that I have no enthusiasm for splenectomy in Banti's disease.

CASE 25392

PRESENTATION OF CASE

A thirty-nine-year-old white American housewife was admitted complaining of severe diarrhea of five months' duration.

The patient was apparently well until nine months before entry when she developed a small ulcer on the nasal septum which failed to heal. Her local physician discovered anemia and prescribed liver injections, intramuscularly, and pills by mouth. With this treatment she apparently improved. The nasal lesion healed and she seemed well for the following two or three months. Five months before admission, however, she suddenly and without any abdominal pain began having diarrhea. Previously she had had one normal firm bowel movement per day but since the onset of diarrhea five months before entry until six weeks before entry had four or five watery movements a day without blood or mucus. The movements were all small and were associated with mild abdominal cramps described as being similar to those noted after ingestion of a cathartic. The pains disappeared with the passage of gas and defecation. She continued to do her housework but gradually became weak and was forced to rest more than usual. Her diet was restricted and consisted mainly of strained vegetables, soft foods and liquids. No meat or salads were taken because they seemed to aggravate the diarrhea. Three months prior to admission she developed a persistent creamy leukorrhea associated with itching and burning about the perineum. Six weeks before admission the number of daily stools increased greatly, so much so that she was unable to keep an accurate count of them. They were more numerous in the morning, fewer in the afternoon; one or two movements occurred every night. The stools were light in color, watery, without blood. She became increasingly weaker and lost 24 pounds in the five-month period. The patient stated that she had had a chronic cough productive of white, sticky phlegm which had been present for an indefinite period, but she experienced no chest pain or precordial distress. She had had amenorrhea for the past three months.

The patient had always been well until the present illness. The family and past histories were noncontributory. There was no history of tuberculosis.

Physical examination revealed an emaciated, weary-looking woman who appeared older than her stated age of thirty-nine, weighing about 90 pounds. The skin was dry, loose and redundant; the mucous membranes pale. The tonsils were large. The chest was clear. The heart was negative; the blood pressure 140 systolic, 80 diastolic. The abdomen was distended, slightly tympanitic and tender but without spasm. There were a few tinkles of peristalsis heard on auscultation. Vaginal examination showed a profuse white discharge, a third-degree laceration, marked cystocele and rectocele and a mass above the broad ligament on the right. Fecal contents were present in the vagina. Rectal examination revealed a rosary of hemorrhoids with the presence of an ulcer just inside the anal sphincter which had soft raised edges. There was no definite stricture of the rectum, but a narrowing of the rectal canal was noted at a point reached by the fingertip. Proctoscopic examination showed granularity of the rectal mucosa and many minute shallow ulcerations.

The temperature was 101.6°F., the pulse 100, and the respirations 22.

The urine had a specific gravity of 1.010, a trace of albumin, one or two white cells and an occasional hyaline cast. The blood examination revealed a red-cell count of 3,300,000 with 50 per cent hemoglobin and a white-cell count of 15,000 with 85 per cent polymorphonuclears, 10 per cent lymphocytes, 2 per cent eosinophils and 3 per cent monocytes. The red blood cells were slightly microcytic. The stool showed a 2+ guaiac test but no amebae. The blood culture on two occasions was negative. A blood Hinton test was negative. The blood sugar was 69 mg. per cent. The serum nonprotein nitrogen was 14 mg. per 100 cc., the serum chloride 95.5 cc. of N/10 sodium chloride, the serum protein 4.1 gm.

A tuberculin test of 1:1000 using 1/10 cc. was negative.

The x-ray findings were those of incontinence with narrowing of the rectum. There was a soft-tissue mass which appeared to be extrinsic and a fistula just above the anus. The more proximal bowel was not demonstrated. There was Paget's disease of the right pelvis. The diaphragm was low in position, normal in outline. The heart size was at the upper limits of normal. The aorta and mediastinum showed no increase in width or density. The apices and lung fields were clear. The visible bones showed no evidence of metastasis.

The patient ran a septic course throughout her hospital stay, the temperature ranging from 99 to 105°F., averaging about 102°F. Two days after admission she became mentally confused and paranoid. On the fourth and fifth hospital days, however, this improved and she appeared normal and mentally well oriented. Her abdomen continued to be tender, diffusely and markedly distended. No definitely localized masses could be palpated. She was given numerous blood transfusions. On the sixth hospital day an ileostomy was performed under local anesthesia. At 4:30 a.m. on the seventh hospital day the patient, who had previously been comfortable and conscious, asked for a bedpan and when the nurse returned with it the patient was gasping for breath and in a few moments stopped breathing.

Differential Diagnosis

Dr. F. Dennette Adams: The history of gradually increasing diarrhea over a period of five months with mild abdominal cramps and small movements is most suggestive of inflammatory disease of the large bowel, ulcerative colitis, dysentery, tuberculosis, or perhaps an obstructive lesion such as carcinoma, or diverticulitis. With most of these disorders one expects to find some blood in the stools, but absence of blood fails to exclude any of them. I cannot account for the small lesion on the nasal septum and question its relation to the gastrointestinal situation. Septal ulceration, or perforation, always most strongly suggests syphilis, but we have no other indication of that disease.

With the story of anemia relieved by liver injections, one might suspect some deficiency state, but in this case the diarrhea and other intestinal symptoms seem to me to be much greater than one would expect in a deficiency state without other manifestations.

A lesion of the small bowel might perhaps be considered, but the symptoms seem more suggestive of large bowel disturbance. Carcinoma of the pancreas may produce intractable diarrhea but only if there is a considerable degree of pancreatic insufficiency. Pancreatic insufficiency, however, is not common and when it occurs the stools are large. The symptoms of pancreatic carcinoma, furthermore, are referred to the upper abdomen, — indigestion, flatulence and later epigastric pain.

A Physician: Would it be possible to have regional ileitis, although she did not have mucus?

Dr. Adams: Yes. Regional ileitis, as you know, is a chronic inflammatory disease of the small bowel usually limited to the terminal ileum and affecting young adults. The symptoms are cramp-like pain, alternating constipation and diarrhea and indications of low-grade infection. Moreover, there is tenderness and, often, a palpable mass in the right lower quadrant. In this case the severity of the diarrhea with relative freedom from pain would make me more suspicious of the large bowel.

On the basis of history alone, one cannot explain the purulent vaginal discharge. The most common causes of a thick, creamy leukorrhea are gonorrhea and *Trichomonas vaginalis*. In this case, however, one would consider the possibility of an infection in the vagina secondary to that in the rectum and, of course, when, as is indicated under physical examination, one finds fecal material in the vagina, it is proper to assume that the pus is the result of secondary infection.

The physical examination and laboratory tests show what would be expected in a person worn down by intractable diarrhea. Except for the local physical findings, they do not help us with the diagnosis. The narrowing of the anus without definite stricture and the area of ulceration point toward one of the ulcerative lesions of the large bowel. The proctoscopic findings of granularity and shallow ulcerations of the rectal mucosa confirm our suspicions. It seems reasonable to assume that the pelvic mass is of an inflammatory nature and probably the result of the extension of infection, either directly from the bowel, or upward from the vagina. The x-ray examination of the large bowel is not particularly helpful.

The negative chest plate would tend to steer us away from a diagnosis of intestinal tuberculosis, but it must be remembered that tuberculosis of the bowel can occur in the absence of pulmonary tuberculosis. The negative tuberculin test is further evidence against tuberculosis.

A Physician: How much confidence can you put in a tuberculin test?

Dr. Adams: That is a difficult question to answer. I believe in a case of this kind a negative tuberculin test is quite conclusive.

A Physician: That is with fresh tuberculin?

DR. TRACY B. MALLORY: It keeps fairly well.

A PHYSICIAN: It seems to me that I have seen a lot of negative tuberculin tests in later proved cases.

DR. MALLORY: I am surprised at that. I have very seldom seen a negative tuberculin test in the face of active tuberculosis with one exception—that is a more or less moribund patient.

DR. ADAMS: Now, what conclusions can we draw regarding this case? We have not sufficient evidence on which to make a definite diagnosis. I am convinced, however, that we are dealing with an inflammatory, ulcerative disease of the large bowel; probably either ulcerative colitis, dysentery, or tuberculosis. There is little evidence in favor of tuberculosis. This disease usually affects the upper part of the large bowel, not the lower part. The tuberculin test is negative, x-ray films of the chest are negative, and the disease has progressed more rapidly than is usually the case with intestinal tuberculosis. The absence of amebae in one or two stool examinations does not exclude amebic dysentery. And, of course, in a case as far advanced as this one, we have no way of excluding bacillary dysentery, which at this stage gives a picture indistinguishable from ulcerative colitis.

With the extent of the pelvic findings, I suppose one might have to consider tuberculosis of the pelvic organs with secondary involvement of the large bowel, yet this does not seem as tenable a diagnosis as a disease starting in the large bowel and I do not believe that spread of tuberculous infection of the pelvic organs to the rectum is common. Lymphopathia venereum (lymphogranuloma inguinale) is a not uncommon cause of rectal stricture, but need not be considered here because of the absence of genital lesions and regional lymph-node disease.

I believe, then, that we are dealing with a case of fulminating ulcerative colitis of the so-called idiopathic type with extension into the vagina and pelvis. I have not accounted for the ulcerative lesion on the nose and do not know how to account for it.

The immediate cause of death was undoubtedly pulmonary embolism. The history is absolutely typical and on the law of chances one would expect to find that the source of the embolism was an area of phlebitis in a vein of the pelvis, a leg, or perhaps the mesentery in the region of the ileostomy.

CLINICAL DIAGNOSIS

Chronic ulcerative colitis.

DR. ADAMS'S DIAGNOSES

Idiopathic ulcerative colitis with extension into the pelvis and vagina.
Pulmonary embolism, terminal.

ANATOMICAL DIAGNOSES

Chronic ulcerative colitis.
Perforation of rectal fistula into pouch of Douglas.
Peritonitis, acute generalized.
Subacute bacterial endocarditis.
Pulmonary infarction, bilateral.
Infarcts of kidneys, multiple.

PATHOLOGICAL DISCUSSION

DR. MALLORY: She did have diffuse and severe ulcerative colitis with ulceration through the wall of the rectum into the vagina or perhaps more exactly ulceration into the pelvis and the pouch of Douglas, and then secondary ulceration into the vagina. Eventually, as a terminal event the abscess ruptured also into the peritoneal cavity to produce a generalized peritonitis.

DR. ADAMS: So that mass was inflammatory tissue?

DR. MALLORY: Yes, an abscess mass in the pouch of Douglas. Some of the other findings are not shadowed at all by a clinical story. It is not very uncommon for one of these patients to develop a bacterial endocarditis before death. Dr. McKittrick recently brought up that possibility in a case which he was discussing. His patient did not have it but this patient who had nothing to suggest it did have fairly extensive acute bacterial endocarditis. Some infarcts were found in the lungs, — relatively small ones and several scattered small emboli were found in both lower lobes, but no major pulmonary embolus. We were rather skeptical at autopsy whether the small emboli were numerous enough to account for sudden death. One other slightly unusual complication is that she had an enlarged spleen full of amyloid. Ulcerative colitis is a perfectly good source for amyloid with prolonged loss of body protein from the purulent exudate which occurs but it is not common.

DR. ADAMS: Five months is a short time in which to develop amyloid deposits.

DR. MALLORY: Yes.

DR. ADAMS: Was the endocardial lesion on the right or left?

DR. MALLORY: On the left, on the mitral valve.

DR. ADAMS: So that pulmonary emboli did arise from phlebitis somewhere?

DR. MALLORY: Yes.

DR. ADAMS: She had changes in the kidney?

DR. MALLORY: Several small infarcts were found in the kidneys grossly and a few microscopic ones.

DR. ADAMS: Did you form an opinion as to the ulcer on the nose?

DR. MALLORY: No.

DR. ADAMS: What is the usual picture of tuberculosis of the genital tract? Could she have tuberculosis of the genital tract which might ulcerate into the gastrointestinal tract, the reverse of this picture?

DR. MALLORY: Usually tuberculosis of the genital tract is of the so-called hyperplastic type, most marked in the tubes though it may be fairly extensive in the endometrium. I cannot remember seeing it involve the cervix and I cannot remember seeing any case with ulceration into the rectum.

A PHYSICIAN: Is it common to find ulcerative colitis going through the rectal vaginal septum?

DR. MALLORY: No, not common but there is no reason it should not occur. A significant number of cases of ulcerative colitis eventually develop perforation of the bowel. A great many patients with ulcerative colitis, moreover, develop extensive fistulas and ulcerations around the anus, and I do not think it surprising that the vagina should be involved.

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Communications should be addressed to the *New England Journal of Medicine*, 8 Fenway, Boston, Mass.

PRENATAL BLOOD TESTS

The passage of the recent law, a copy of which appears elsewhere in this issue of the *Journal*, requiring a blood test for syphilis on every pregnant woman places a heavy responsibility on every individual physician in this state who accepts an obstetric case. This responsibility is intensified by the fact that the medical profession is placed on its honor, so to speak, in view of the fact that no penalty is provided in case of failure to carry out the test. At the same time no law should have been required to make this procedure compulsory, although such a step can be construed as a part of the educational program in syphilis. All physicians should know that the value of such tests in the detection of syphilis in mothers and the prevention of congenital syphilis has been amply demonstrated; however, this knowledge deserves wide distribution. The detection and adequate treatment of infected mothers before the fifth month have practically prevented syphilis in the child and some treatment even in the last few months of pregnancy has been shown to increase the proportion of healthy babies. It has, therefore, been rightly said that "risk of treatment is so slight and the benefit so great that the withholding of arsphenamine in the last months of pregnancy amounts to little less than gross negligence."[1] The absence of early, active congenital syphilis from the teaching clinics where routine serological examinations have been made is practical proof of such procedure. Further confirmation is found in a recent ten-year study[2] of 35,000 pregnant women in the Los Angeles Maternity Service, of whom 2.04 per cent were found to have syphilis; in the 500 women with syphilis who could be adequately followed, only 6 syphilitic infants were born to those mothers who had had more than ten arsenic and ten bismuth injections.

The responsibility of the physician does not end with the taking of the blood and its shipment to the laboratory; for him the interpretation of the report is just as important. Every positive serological test does not mean syphilis, nor do all patients with syphilis have a positive reaction. It is unfortunate that such great emphasis has been placed on the test in prenatal and premarital laws and so little on the physical examination. Every positive report requires rechecking once, twice or more for confirmation, requires careful physical examination by a physician who is willing to make such an examination, and requires careful investigation of the patient's history and the history of her husband and their children, as well as that of her parents and siblings for possible evidence of congenital syphilis in herself. If a positive diagnosis is made, treatment should be continued throughout the pregnancy, unless definite contraindications exist. Following adequate therapy the child will in all probability be protected, but should be checked and watched for at least two years. The mother's treatment should be continued to fulfill the requirements of her particular case.

Preventive medicine has made another conquest. Control over diphtheria, typhoid fever, malaria, yellow fever and other diseases has been demonstrated, and to the list is added congenital syphilis; with the co-operation of potential mothers and the medical profession it is completely preventable. Truly the responsibility of the physician grows apace as the world and medicine march on!

REFERENCES

1. Beck, A. C., and Daily, W. T.: Syphilis in pregnancy. *Syphilis.* 193 pp. Lancaster, Pa.: Am. A. Advancement Sc., 1938. Pp. 101-110.
2. Halloran, C. P.: A review of the records of syphilitic pregnant women treated at the Los Angeles Maternity Service over a ten-year period. Am. J. Obst. & Gynec. 38:135-139, 1939.

HOLMES OF THE BREAKFAST-TABLE

A SHORT, readable life of Oliver Wendell Holmes, Boston's beloved doctor and poet, forms a welcome addition to the literature of medical history. There has been no volume of considerable extent in regard to Holmes since the *Life and Letters,* by John T. Morse, Jr., published in 1896. Mr. M. A. DeWolfe Howe,* well known to all Bostonians for his eminence in letters, has now written a short but delightful life of Holmes, in which one can find not only a splendid summary of Holmes's literary contributions but also an estimate of the value of his medical work.

Shortly after graduating from the Harvard Medical School, Holmes made two important contributions to medicine: his famous address on "Homoeopathy, and its Kindred Delusions" in 1842 and his even more important paper on "The Contagiousness of Puerperal Fever" in 1843. The latter paper was not widely known until reprinted in 1855 under the title, "Puerperal Fever as a Private Pestilence." This is, without question, Holmes's most important single contribution to medicine, and as such, Mr. Howe has given it ample recognition. Subsequently Holmes gave the words "anesthesia" and "anesthetic" to the world, and during his long tenure of office as professor of anatomy at the Harvard Medical School, he made important contributions to our knowledge of the microscope. In addition, Holmes made many other contributions of a lesser character to medicine. His essay on "Acute Pericarditis," written as a dissertation for the degree of doctor of medicine at the Harvard Medical School in 1836, has only recently been published by the Welch Bibliophilic Society (1937).

When his son, later Justice Oliver Wendell Holmes, was injured in the Civil War, Dr. Holmes went in search of "the Captain," who was badly wounded and was cared for by Dr. William Hunt, of Philadelphia. Recently the Boston Medical Library has acquired two letters from Holmes to Dr. Hunt. The first, dated 1861, is printed by Mr. Howe and gives an excellent idea of Holmes's difficulties in bringing his son back to Boston, where Dr. Bigelow could look after him. The second, thirty years later, in 1891, recalls Dr. Hunt's kindness to "the Captain," and Holmes, in his characteristic way, wrote: "I remember your kind offices during the war when my son came home with two new button-holes in his congenital waistcoat. I thanked you then. I thank you again. Your patient is now a justice on the Supreme Bench of Massachusetts." There are other anecdotes in Mr. Howe's book that will delight physicians in general. The whole biography, moreover, is a sound summary of Oliver Wendell Holmes and as such should be read by every physician with historical interests.

*Howe, M. A. DeWolfe: *Holmes of the Breakfast-Table.* 172 pp. London and New York: Oxford University Press, 1939.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., *Secretary*
330 Dartmouth Street
Boston

SEPTIC ABORTION — DEATH

Mrs. E. S., a nineteen-year-old para II, entered the hospital on July 1, 1911, complaining of pain in the lower abdomen, chiefly on the right side, of four days' duration. She had experienced several chills, followed by fever and some nausea.

Her last menstrual period had been on May 9 so that she was just about eight weeks pregnant. She was flowing very little.

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

The family history was not obtained. Her past history was uneventful. She had had one full-term normal delivery with apparently normal pregnancy and puerperium.

Physical examination showed a well-developed woman who looked definitely sick. The tongue was moist, covered with a white coat. The pharynx was somewhat reddened. The temperature was 102°F., pulse 128 and respirations 22. There was a loud blowing systolic murmur over the precordia not transmitted elsewhere. The lungs were uniformly resonant with clear respiration. The abdomen was generally tender with spasm present in both lower quadrants. There was more tenderness and spasm in the right lower quadrant.

On vaginal examination there were found a markedly reddened urethra, multiparous perineum and a moderate bilateral laceration of the cervix. The cervix was soft and the uterus appeared to be enlarged to a size corresponding to a three-month pregnancy. In the tender right vault a questionable mass was felt.

The white blood count was 16,000. The urine was cloudy, the specific gravity was 1.024, and there was present a slightest possible trace of albumin, but no sugar. The sediment showed numerous pus cells, some red blood corpuscles and numerous epithelial cells.

On the following day the patient passed by vagina a mass which was definitely placental tissue. She then admitted the use of medicine to bring on an abortion but denied instrumentation.

The attending obstetrician felt that the uterus should be emptied at once, so without anesthesia the cervix was dilated and the uterus curetted of a large amount of the products of conception. A culture was taken which showed a mixed growth with staphylococci predominating. The uterus was washed out with salt solution and packed with a gauze strip soaked with tincture of iodine. Following this procedure, the patient's pulse became rapid and thready. The rate varied between 150 and 160. The abdomen became distended, tender and rigid. The patient vomited copiously. Her condition became steadily worse and she died early the following morning.

Comment. This is a typical case of septic abortion and shows how all such cases were treated twenty-five years ago. The history makes no particular mention of hemorrhage; the patient did not complain of it, nor does the record mention it. Today upon entrance if bleeding were not marked, a culture would be taken from the uterus, a blood culture would be obtained and the uterus left alone. The uterus would not be curetted today in the absence of hemorrhage. Twenty-five years ago a rigorous curettage was the accepted form of treatment and the results too often in truly infected cases followed the course of this particular one. Conservatism in the absence of hemorrhage should dictate all treatment. The invasion of the uterus to remove material which is the indirect cause of the bleeding should be undertaken gently, the purpose being to remove material so that the uterus may contract and the sinuses close. Sulfanilamide in cases of streptococcal infection has often proved curative.

It is also perfectly possible that this abortion may have been stimulated by artificial means and, had the patient presented herself sooner and conservative treatment followed, this tragic outcome might have been averted.

PRENATAL BLOOD TEST LAW

The following is a transcript of the amendment, recently passed by the Legislature, which specifies that the bloods of all pregnant women shall be tested for syphilis. The bill (House 2265) was signed by the Governor on August 3, and will become effective on November 1.

AN ACT REQUIRING A SEROLOGICAL TEST FOR SYPHILIS OF PREGNANT WOMEN.

Chapter one hundred and eleven, section five, of the General Laws is hereby amended, by inserting after section 121, as appearing in the Tercentenary Edition, the following new section:

Section 121A. A physician attending a pregnant woman in this commonwealth during gestation shall take or cause to be taken a sample of blood of such woman at the time of first examination, and shall submit such sample for a standard serological test for syphilis to a laboratory of the Department of Public Health or to a laboratory approved for this test by the department; provided, that not more than one physician attending such a pregnant woman during gestation shall be required to comply with the provisions of this section.

DEATH

WILKINSON — WILLIAM D. WILKINSON, M.D., of Boston, died September 23. He was in his forty-second year.

Dr. Wilkinson received his degree from the Middlesex College of Medicine and Surgery in 1928. He was a member of the Massachusetts Medical Society and the American Medical Association.

MISCELLANY

THE RELATION OF THE PHYSICIAN TO THE TUBERCULOUS PATIENT

Having noticed that patients who were not receiving collapse therapy left the sanatorium prematurely (signed a release) with far greater frequency than those who did receive collapse, Dr. Kruger of the Hudson County Tuberculosis Hospital attempted to find the reasons for their apparent dissatisfaction. And with a knowledge that a

goodly number of patients who sign a release return to the sanatorium later with their lesions much more advanced in extent, he attempted to create a better understanding of every patient so that they would be less inclined to leave the sanatorium before they should. His paper (The relation of the physician to the tuberculous patient, *J. A. M. A.* 112:2123–2126, 1939) may be summarized as follows:

Three reasons account for the self-discharge of patients not receiving collapse surgery: a feeling of well-being, conditions at home requiring their return to work, the patients' lack of appreciation of the importance of bed rest in the treatment of tuberculosis and their lack of education regarding the advantages of the sanatorium or hospital.

Many patients admitted to the sanatorium are not acutely ill and except for a slight cough or a sudden hemoptysis were not aware that they were ill. Mass tuberculin testing has revealed many cases of tuberculosis that are entirely asymptomatic. The news is generally received with some degree of shock, especially by those who think of tuberculosis as "consumption" and who are not aware of what can be done therapeutically. The way a person reacts to the knowledge that he has tuberculosis and will have to remain in a sanatorium for a long time depends on three factors: his inherent characteristics, whether his tendency is toward an introvert or extrovert type, his station in life at the moment and his responsibilities, such as the support of a family.

Extroversion may be defined as the turning of an interest outward toward some object. Introversion is the contemplation of one's own thoughts and feelings. Tuberculous patients can hardly be rigidly classified into these two groups, but in each individual is the tendency to lean toward one or the other and when an individual develops tuberculosis that tendency becomes more manifest. The neurasthenic manifestations encountered in tuberculous patients are not specific but are frequently seen in individuals with any protracted illness. The physician dealing with tuberculous patients must adjust and adapt them to their illness as close to the point of contentment as is possible, instilling in them the hope and certainty that they will soon recover and return to their former usefulness to society. The patient confined to a bed-rest regimen for a number of months must be made to believe in the need for such treatment.

The extrovert is characteristically carefree and unconcerned about his condition. The problem that confronts the physician is to gain the confidence of this patient and to explain the need for prolonged treatment if he is to make satisfactory progress. Occasionally one will encounter a patient who does not adequately appreciate the necessity of intensive treatment. Here one must be frankly outspoken and attempt to show what may happen if he fails to heed the physician's advice. The patient must be made to realize that he is a sick person in spite of his apparent well-being. He must be convinced of the fact that tuberculosis, when discovered early, may be easily controlled, whereas, when the disease is of a more advanced type, it is more difficult to obtain a satisfactory result. In order to obtain the full co-operation of the patient, it is essential that he be advised concerning the development and progress of the disease through the medium of education. The physician in charge must make an indelible impression on his patient.

It is with the introvert that we must use the greatest of discretion. He has kept his troubles to himself, for his best defense has been to keep them hidden. It is this type of individual that should be prevailed on to share his innermost thoughts with the physician. He must not be allowed to become depressed, for a happy patient with a happy, healthy state of mind is a most desirable asset in fighting a chronic disease such as tuberculosis. On the other hand, the practice of minimizing a patient's lesion, such as diagnosing an infiltrate as a "bronchitis" so as to avoid any "embarrassment" to the patient, is to be condemned. Too often patients are seen who state that their physician, several months prior to admission, told them that they had a "little bronchitis" or a "tiny spot on the lung" and advised only a couple of weeks' rest in bed. However, in a certain few select cases it may be perfectly justifiable to minimize somewhat the extent of the process. Those patients who are apprehensive and worried about themselves must be reassured and convinced that their trouble is not too far advanced and that with time they will recover. An attitude of optimism must be assumed by the doctor and imbued in the patient. The mere mention of the word "cavity" may cause them to become panicky and apprehensive.

When making staff rounds it is best not to discuss the case in front of the patient, except in the form of encouragement. The patient will listen intently and will invariably misinterpret every statement. The physician should devote as much time as possible to obtaining a sympathetic understanding with the patient and discuss at length any problem that may be brought up, no matter how trivial it may seem. He should be encouraged to keep interested in the news of the day. The widespread use of the radio is endorsed; its effects on the well-being of the patients have been so encouraging that in the new Hudson County Tuberculosis Hospital, every bed is supplied with an individual ear-set, so that a patient may have the choice of listening to one of four different programs without in any way interfering with the other patients in the ward.

When pneumothorax is attempted and fails, the patient will become despondent, feeling that his only hope for recovery is lost. To obviate this apparent setback one must explain that pneumothorax is merely an adjunct in the treatment; that the patient will improve with bed rest alone, but that if pneumothorax is successful it will help rest the lung a little more and tend to hasten recovery.

One has to contend with patients wanting to be discharged because they feel they can continue bed rest at home. This is not true. The majority of those who sign a release become careless and soon have to return because of reactivation of the lesion. With this group the physician must stress the dangers involved, frankly and outspokenly. Citing as an instance an individual, known to the patient, who having refused advice has had to return with an advanced lesion, often helps him to comprehend the significance of his intentions.

One thing must be emphasized to all tuberculous patients, that rest means not only physical rest but also mental rest. The object of physical rest is to diminish the work of the lungs by diminishing the number and extent of the respiratory excursions. Yet, what good is such physical rest if the patient maintains a state of high nervous tension as seen in the neurasthenic type of individual? It is not infrequently noted that patients with an extensive pulmonary involvement who are cheerful and mentally stable show a favorable progress.

The tuberculous person must be shielded from the cares and responsibilities of home and business. Friends and members of the family must be cautioned against bringing any news to the patient which may in any way disturb him. For that reason, sanatorium care for the

patient is the desirable thing, whenever feasible, for here the individual is more or less isolated from home influences, which, although well meant, are not always to the patient's best interests, and, in addition, he is under constant supervision with the knowledge that he is in the same hospital with a number of others similarly afflicted and all having the same goal. Also, from a public-health standpoint, his chances of spreading his infection are minimized.—Reprinted from *Tuberculosis Abstracts* (September, 1939).

NOTE

Dr. Leonard Carmichael, president of Tufts College, was recently elected president of the American Psychological Association. He succeeds Dr. Gordon W. Allport, assistant professor of psychology at Harvard University.

Dr. Carmichael was previously professor of psychology at Brown University and at the University of Rochester.

NOTICES

ANNOUNCEMENT

David H. Gersh, M.D., announces the opening of an office at 1194 Massachusetts Avenue, Arlington.

REMOVAL

S. Richard Muellner, M.D., announces the removal of his office to 520 Beacon Street, Boston.

BOSTON DOCTORS' SYMPHONY ORCHESTRA

The Boston Doctors' Symphony Orchestra will resume rehearsals October 19 at Brandon Hall Hotel, 1501 Beacon Street, Brookline. These rehearsals will be held every Thursday at 8:30 p.m. Those interested in becoming members should communicate with Dr. Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430).

FAULKNER HOSPITAL CLINICOPATHOLOGICAL CONFERENCE

The monthly clinicopathological conference of the Faulkner Hospital will be held on Thursday, October 5, at 5:00 p.m. There will be a discussion of cases by Drs. F. G. Balch, Jr., and M. B. Strauss.

Physicians and all other members of the medical profession are cordially invited to attend.

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

Clinic	Date	Orthopedic Consultant
Salem	October 2	Harold C. Bean
Haverhill	October 4	William T. Green
Lowell	October 6	Albert H. Brewster
Gardner	October 10	Mark H. Rogers
Pittsfield	October 16	Francis A. Slowick
Northampton	October 18	Garry deN. Hough, Jr.
Brockton	October 19	George W. Van Gorder
Worcester	October 20	John W. O'Meara
Fall River	October 23	Eugene A. McCarthy
Hyannis	October 24	Paul L. Norton

SOCIETY MEETINGS AND CONFERENCES

Calendar of Boston District for the Week Beginning Monday, October 2

Monday, October 2

*4 p.m. Physicians and medical students are cordially invited to attend a clinic presented by the medical, surgical and orthopedic services of the Infants' and Children's hospitals in the amphitheater of the Children's Hospital.

Tuesday, October 3

*10 a.m.–12:30 p.m. Boston Dispensary tumor clinic.

7:30 p.m. Greater Boston Medical Society. University Club, Boston.

Wednesday, October 4

*12 m. Clinicopathological conference. Children's Hospital Amphitheater.

Thursday, October 5

*5 p.m. Faulkner Hospital clinicopathological conference.

Friday, October 6

*10 a.m.–12:30 p.m. Boston Dispensary tumor clinic.

12 m. Urological conference at the Massachusetts General Hospital, lower amphitheater, Out-Patient Department.

Saturday, October 7

*10 a.m.–12 m. Staff rounds of the Peter Bent Brigham Hospital. Conducted by Dr. Soma Weiss.

*Open to the medical profession.

September 29–30 — New England Surgical Society. Beverly and Salem.

October 3 — Greater Boston Medical Society. Page 480, issue of September 21.

October 5 — Faulkner clinicopathological conference. Notice above.

October 13 — Pentucket Association of Physicians. 8:30 p.m., Hotel Bartlett, Haverhill.

October 15–20 — American Public Health Association. Page 441, issue of September 14.

October 23–November 3 — New York Academy of Medicine. Page 977, issue of June 8.

November 8, 9 — New England Society of Physical Medicine, in conjunction with the Academy of Physical Medicine, Hotel Kenmore, Boston. Program to be announced.

December 2 — American Board of Obstetrics and Gynecology. Page 1019, issue of June 15.

January 6, June 8–11, 1940 — American Board of Obstetrics and Gynecology. Page 160, issue of July 27.

March 7–9, 1940 — The New England Hospital Association. Hotel Statler, Boston.

May 14, 1940 — Pharmacopoeial Convention. Page 894, issue of May 25.

June 7–9, 1940 — American Board of Obstetrics and Gynecology. Page 1019, issue of June 15.

District Medical Society

SUFFOLK

November 2 — Censors' meeting. Page 441, issue of September 14.

BOOKS RECEIVED FOR REVIEW

Diseases of the Skin. Richard L. Sutton and Richard L. Sutton, Jr. Tenth edition. 1549 pp. St. Louis: C. V. Mosby Co., 1939. $15.00.

Pathogenic Microörganisms: A practical manual for students, physicians and health officers. William H. Park and Anna W. Williams. Eleventh edition. 1056 pp. Philadelphia: Lea & Febiger, 1939. $8.00.

The Story of Surgery. Harvey Graham. 425 pp. New York: Doubleday, Doran & Co., Inc., 1939. $3.75.

Tests of Mental Development: A complete scale for individual examination. F. Kuhlmann. 314 pp. Minneapolis, Nashville and Philadelphia: Educational Publishers, Inc., 1939. $2.00.

Maternal Care and Some Complications: The principles of antepartum, intrapartum, and postpartum care and of the management of some serious complications. Edited by F. L. Adair. 194 pp. Chicago: University of Chicago Press, 1939. $1.50.

Practical Obstetrics. P. Brooke Bland and Thaddeus L. Montgomery. Third revised edition. 877 pp. Philadelphia: F. A. Davis Co., 1939. $8.00.

Anatomy and Physiology. Frederic T. Jung, Anna R. Benjamin and Elizabeth C. Earle. 637 pp. Philadelphia: F. A. Davis Co., 1939. $3.50.

International Health Division: Annual report, 1938. 233 pp. New York: The Rockefeller Foundation, 1938.

Office Gynecology. J. P. Greenhill. 406 pp. Chicago: The Year Book Publishers, Inc., 1939. $3.00.

A Handbook of Elementary Psychobiology and Psychiatry. Edward G. Billings. 271 pp. New York: The Macmillan Co., 1939. $2.00.

BOOK REVIEWS

An Introduction to Sociology and Social Problems: A text-book for nurses. Deborah M. Jensen. 341 pp. St. Louis: C. V. Mosby Co., 1939. $2.75.

The average person erroneously thinks of a sociologist as a rather naïve and well-intentioned social reformer or even as a socialist. Actually a sociologist is a student of social processes, of development and change in institutions; a student of social groups. He is naturally also interested in social problems because they thwart human needs which social institutions grow up to serve. The sociologist seeks new knowledge about society, attempts to understand it with the hope that ultimately rational beings may be able to control social processes more intelligently in order to place social science at the service of man. He is not a reformer, though as a private citizen he may be interested in several reforms. But his purpose in life is not "to upset the apple cart." Just as the physician attempts to understand, prevent and control disease and aims to think straight about fundamentals of etiology, diagnosis, and prognosis, so the scientific student of society follows, or tries to follow, exactly the same principles.

This textbook on sociology and social problems for nurses has been written by a former assistant director of the School of Nursing at Washington University. It is intended to straddle two courses — to be useful both in an introductory course and in one on social problems.

In a crowded curriculum for nurses there is need for a clear, brief statement of fundamentals. This book will probably fulfill that need. However one can only regret that it has been put together so much by the scissors-and-paste method. There are too many long, quoted passages from other texts, about half the book being so constituted. One quoted passage (pp. 158-176) is over 18 pages long! This is milking the cow to the point of emaciation. However, the passages quoted are, on the whole, well chosen and from generally accepted books, and because of this the text should give the student a good conception of the general range of material considered under the subjects in the field: man's social nature and the development of personality; collective behavior; the community; the family; social change; social problems; the individual's reaction to illness; and the range of social problems in the modern community. After a discussion of each major topic there is a brief treatment of the application of this knowledge to the needs of nurses.

The style is quite uninspired — sometimes very awkward, occasionally grammatically incorrect. But, on the other hand, the scope is broad, and the meaning usually clear. This text sticks to fundamentals. It is unfortunate that the author has not done more of her own thinking.

Do You Want to Become a Doctor? Morris Fishbein. 176 pp. New York: Frederick A. Stokes Co., 1939. $1.50.

This book contains a concise presentation of the various steps in medical education, a description of medical schools and a consideration of state-board examinations, internship and hospital systems. It is well written and contains data that should be at the fingertips of most physicians. The book is to be recommended not only to prospective medical students but to medical students themselves, to their teachers and to those already in practice. The information is well organized and surveys in general the whole present-day field of medicine, describing in detail the several stages of academic preparation and offering much practical advice. The essentials of a good medical school are defined, and the comparative costs of education under varying circumstances are presented. The final chapter covers medical organizations and their relation to society.

Manual of Toxicology. Forrest R. Davison. 241 pp. New York: Paul B. Hoeber, Inc., 1939. $2.50.

A pocket-size manual must necessarily show care in the selection of essential information. This book gives brief notes over a broad field in a manner which should be convenient for the practicing physician or student, since simple descriptions of methods and tests of toxicological analysis tend to bridge the gap between the problems of the physician and the work of the toxicologist.

For the purpose intended, — to provide a concise and convenient reference of basic knowledge useful to the physician, — the book seems to be well planned. It should not be confused with texts planned primarily for the toxicologist.

The Physiology of Exercise: A text-book for students of physical education. James H. McCurdy and Leonard A. Larson. Third edition, thoroughly revised. 349 pp. Philadelphia: Lea & Febiger, 1939. $3.75.

This book is written by two men who have attained high standing as teachers in this field and have a thorough knowledge of the subject.

The book is divided into three parts. The first deals with the general effects of exercise on bodily functions. This is primarily concerned with data relative to heart rate, blood pressure, respiration and neuromuscular reaction following various forms of exercise. The second considers in detail the changes in bodily function accompanying various athletic feats — from football and marathon running to golf, mountain climbing and aquatics. There is also an interesting and instructive chapter inserted on "Physical Education for Women," and another on "Muscular Exercise for People Over Forty Years of Age." The third concerns methods of indicating efficiency of bodily functions and discusses the physiology of a large number and variety of laboratory and clinical tests of bodily ability, including the cardiovascular test devised by one of the authors. Each chapter is followed by a comprehensive bibliography totaling in all over 1500 references.

This book was written as a "textbook for students in physical education" but lacks the easy uninterrupted reading of a good textbook. It is rather a book for reference, and is so complete that it is difficult to detect the omission of any subject coming within its scope. The material is exceptionally well arranged, and the book will undoubtedly prove to be valuable for the student or laboratory worker.